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TRANSACTIONS

OF THE

LITERARY & HISTORICAL SOCIETY

OF

QUEBEC

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VOLUME I.

QUEBEC:

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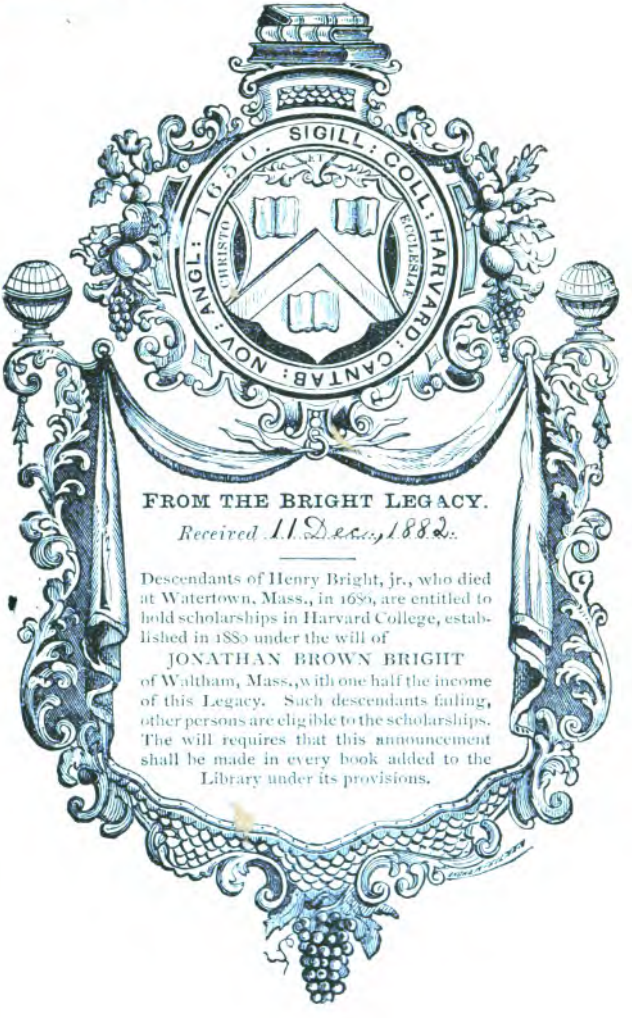

FROM THE BRIGHT LEGACY.

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Descendants of Henry Bright, jr., who died at Watertown, Mass., in 1689, are entitled to hold scholarships in Harvard College, established in 1880 under the will of

JONATHAN BROWN BRIGHT

of Waltham, Mass., with one half the income of this Legacy. Such descendants failing, other persons are eligible to the scholarships. The will requires that this announcement shall be made in every book added to the Library under its provisions.

R. B. O'Callaghan Esq
R. D.

With the kind Regards
of the Sem. of Quebec

☞ *See Errata—Page 263.*

TRANSACTIONS

OF THE

LITERARY AND HISTORICAL

SOCIETY

OF

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TABLE OF CONTENTS.

PAGE.

List of Officers of the Literary and Historical Society of Quebec and Preface,
Inaugural Address ..... ii to xxxvi
On the Geology of Lake Superior, by Commander H. W. Bayfield, R. N. 1
On Colouring Materials produced in Canada, by William Green, Esq. 43
On Meteorological Phenomena observed in Canada, by Captain Bonnycastle, R. E. 47
Notes on the Saguenay Country, by A. Stuart, Esq. 52
Observations on a few of the Rocks and Minerals of Upper Canada, by Captain Bonnycastle, R. E... 62
On the Geology of a portion of the Labrador Coast, by Lieutenant Baddeley, R. E. 71
On the Geognosy of a part of the Saguenay Country, 79
On the Ancient Etruscans Tyrrhenians or Tuscans, by A. Stuart, Esq. 167
Notes on the Country about the Falls of Montmorenci, by Wm. Green, Esq. 181
On the Recent Shells which characterise Quebec and its environs, by Mrs. Sheppard of Woodfield, 188
Journey across the Continent of North America, by an Indian Chief, from Mr. Le Page du Pratz, communicated by A. Stuart, Esq. 198
Observations on the American Plants, described by Charlevoix, by William Sheppard, Esq. 218
Observations on the Myrtus Cerifera or Myrtle-wax Shrub, compiled by W. Green, Esq. 231
Catalogue of Remarkable Coincidences inducing a belief of the Asiatic Origin of the North American Indians, by Major Mercer, R. A. 240
Observations on Crickets in Canada, by the Hon. J. Hale. 254
Catalogue of Canadian Plants, presented to the Literary and Historical Society by the Right Hon. the Countess of Dalhousie 255
Errata 263
Catalogue of the Mineralogical Collection belonging to the Literary and Historical Society 265
And—at the end of the volume, twelve Prints, of which five are Lithographic.

OFFICERS

OF THE

LITERARY AND HISTORICAL SOCIETY

OF

QUEBEC,

For the Year ending 4th June, 1829.

President—FREDERICK BADDELEY, Esq.;

First Vice President—The Hon. JUSTICE BOWEN;

Second Vice President—Hon. A. W. COCHRAN;

Secretary and Treasurer—WILLIAM GREEN, Esq.

THE Literary and Historical Society of Quebec, founded in January 1824, owes its origin to the zeal for the advancement of Science, and to the munificence of the Earl of Dalhousie, late Governor General of British North America.—To that distinguished Nobleman the first idea of its creation is due—The powerful influence of his example supported it during its infancy, and his generous liberality portioned its youth.

The establishment of this Institution, as being the first step by which the rising literature of a Colony is made to approximate, that of the Mother Country, must be interesting to every friend of Science. Its first efforts have an undoubted claim to be viewed with a

degree of indulgence somewhat greater than would be allowed to a similar Institution in most of the European States; for, it must be obvious, that in a Colony where, with few exceptions, the occupations of all, are either Professional, Commercial, or Agricultural, Society, besides being comparatively less extensive, is so constituted, that those who have leisure for scientific enquiry are far from numerous, and there are perhaps none who are so circumstanced as to be able to devote the greater part of their time to the acquisition of knowledge. This Society has, therefore, difficulties to overcome which are peculiar to its situation.

When the Members of this Young Society reflect on the successful efforts made by similar Institutions of the Old World in the pursuit of knowledge, they feel, in regard to their own humble exertions, that there are different gradations in the scale of merit. They have, however, this gratifying recollection, that all additions to the sources of literary and scientific information are valuable and meritorious.

In conclusion, it must be borne in mind, that the first object of this Society is to promote a taste for literature, and scientific enquiry in a New Country.—The following Volume which contains selections from its Transactions, from the period of its foundation down to its junction with the SOCIETY FOR THE ENCOURAGEMENT OF ARTS AND SCIENCES IN CANADA, which formally took effect on the 4th June 1829, will show, in part, how far they have as yet succeeded, in exertions which are universally conceded to be conducive to the good of Society.

Quebec, 10th November, 1829.

AT THE MEETING of the QUEBEC LITERARY AND HISTORICAL SOCIETY, holden at the Castle of Saint Lewis, in the city of Quebec, on Monday, the 31st day of May, 1824—

The following inaugural Address and Essay respecting the early civil and ecclesiastical juridical History of France, written by the Honorable J. SEWELL, Chief Justice of Lower Canada, was read before the Society, by the Author.

Certified,

WM. GREEN,
Secretary.

MY LORD AND GENTLEMEN,

APPOINTED to address a Society, distinguished, in its origin, by the rank and character of its noble Founder, and, in the first stage of its progress, by the respectability and talents of its numerous Members; whose high and meritorious purpose is, to extend more amply the advantages of Science and Literature to a remote, but rising portion of the Great Empire to which we belong, and the beneficial effects of its disinterested labours to future times, I am anxious to devote the period, in which I hope to be honored with your attention, to a subject which, corresponding with the views of your Institution, & involving matter interesting to Science, may, in some degree, be worthy of your notice.

Confining myself, therefore, to the more immediate object of the Society—Historical Research—I shall offer to your consideration an Essay upon the Juridical History of France, antecedent to the erection of the Sovereign Council of Quebec, in the year 1663; the Law, as it was then administered in France, in the Tribunals of the Vicomté of Paris, being, in fact, the Common Law of the division of Canada which we now inhabit(1).

The study of the Municipal Law of every country requires some previous knowledge of its rise and progress.—The obsolete principles of former ages are, most commonly, the foundations of what we possess; and, in many instances, the true object and intent of modern Institutions, can only be known by reference to the history of their origin and gradual improvement. And as I feel assured, that, to persons of liberal education, knowledge of the Law which constitutes the rule of their civil conduct, must at all times be desirable, I cannot but hope that what I am about to offer, upon the peculiar Municipal Law by which *we* are governed, (though,

(1) Edits et Ordonnances, vol. 1. p. 21.

I am conscious, it will be found imperfect,) will nevertheless be favorably received, as an attempt to elucidate a subject which, in Lower-Canada, cannot be thought to be uninteresting.

The conquest of Gaul by the Roman power—the entire subversion of the Roman Government by the Franks—the nearly *total* annihilation of the power of the Crown at the close of the eleventh century, and the subsequent re-establishment of that power, are the events which more immediately affected the Laws of France, and occasioned their successive mutations. To these events, therefore, and to the greater effects which they have respectively produced in her legal polity, our inquiries will at present be confined.

Of the state of Gaul before the Roman conquest, (which was effected under the immediate command of Cæsar, about fifty years before the birth of our Saviour,) but little can be said with any degree of certainty. The inhabitants were then governed by a few unwritten customs and usages, peculiar to themselves, barbarous in the extreme and not meriting the appellation of Laws. Their manners were simple, and produced but few causes of contention, and such controversies as arose, were decided by their Druids, who, as among the ancient Britons, were both Priests and Judges.(1)

A consequence of the Roman conquest was, the introduction of the Roman Law, and for five entire centuries, during which Gaul remained a Province of the Empire, her people were wholly governed by that system. (2) The Roman Law, however, of that day was not the Justinian Code, for that was compiled near a hundred years after the expulsion of the Romans.(3) It consisted of the several Constitutions of the preceding Emperors, and of the writings of certain Civilians.

* * The

(1) Cæsar de Bello Gal: Liber, 5 & 6.
(2) Histoire du Droit François, by l'Abbé Fleury, p. 9 & 10. Vide also, at the beginning of 1st vol. of Henry's, a learned Dissertation, by Bretonnier, which establishes this fact.
(3) Fleury, p. 10.

The Constitutions had been collected in three Codes—the Gregorian, Hermogenian, and Theodosian, but the latter, published by the Emperor Theodosius, confirmed and adopted the two former, and as the writings of the Civilians consisted of such only as were sanctioned by the Code of Theodosius, there is reason to believe that it was the Theodosian Code only which was called the Roman Law.(1)

The power of the Roman Empire, in Gaul, was totally annihilated about the year 450 of the Christian æra. Rome, weakened by the extent of her dominion, and yet more by the degeneracy of her citizens, debased in sentiments, depressed in talents and enervated in courage, (2) fell a sacrifice to the more hardy and enterprising Nations of the North, and the Government of all that extent of Territory, which has since been denominated France, was transferred to Barbarians—to the Franks and their associate Tribes—the Goths and Burgundians,(3) and from the accession of the first Chieftain of the Franks (Merovée,) France dates the origin of her Monarchy, divided into three Dynasties or races of Kings—The Merovingian—the Carlovingian—and the Capetian. The first comprehends Merovée and his descendants, who possessed the Throne from the year 450, to the year 770, when they were succeeded by Charles, the son of Pepin, afterwards called Charlesmagne, and his descendants, who constitute the Carlovingian race, in whose possession it remained until the year 987, when it passed to the Capetian race, who continued in possession, until the death of the late unfortunate Monarch, Louis the 16th, a descendant from Hugh Capet, the first of the Capetian dynasty.(4)

There was not among the Barbarians, by whom the Romans were expelled, any general Government, they were subject, in

(1) Fleury, p. 12.
(2) Gibbon's Decline & Fall, vol. 1st p. 94. 1st. L. C. Dénizart's Discours Préliminaire, p. 59.
(3) Esprit des Loix, Lib. 30, c. 6, vol. 2, p. 354.
(4) See the Histories of France by Duhaillan, Mezeray, &c.

In their own District, to the Chieftain who could do them the most good or the most injury, (1) and, when they conquered Gaul, they took possession of the country as a band of independent clans.(2) Their first object was to secure their new acquisitions, and with this view, the leaders distributed among the soldiery, the lands which they had conquered, with a condition of continued military service annexed to the Grant, an idea which appears to have been suggested by the peculiar situation in which they were placed, and to have been put in practice, as the best means of furnishing that immediate mutual assistance, which was indispensably necessary for the defence and preservation of their conquest. Large districts or parcels of land were accordingly allotted to the Chieftains and to the superior Officers, who were called Leuds (Lords or Seigneurs) (3) and their allotments, which were called feuda (fiefs or fees) were subdivided among the inferior officers and soldiers upon the general condition, that the possessor should do service faithfully, both at home and abroad to him, by whom they were given.(4) Every feudatory was, therefore, bound, when called upon, to defend his immediate superior, from whom he had received, and of whom he held, his estate: that superior to defend *his* superior, and so upwards to the Prince, while, on the other hand, the Prince and every Seigneur was equally bound to defend his vassals or dependants, who held their estates of him, so that the duty of the whole was severally and reciprocally to defend the conquest they had made together, and every part of it.(5) This singular Institution, which is now called the feudal system, by degrees became general in France, and, by the new division of property which it occasioned, with the peculiar maxims and manners to which it gave rise, gradually introduced a species of laws before unknown.

The

(1) Dalrymple's Essay on the Feudal System, p. 5.
(2) Ibid, p. 6.
(3) Dalrymple, p. 11. Loyseau des Seigneuries, §60 & 61, cap. 1.
(4) Loyseau des Seigneuries, cap. 1. §62 to 66.
(5) Wright on Tenures, p. 8.

The whole of France, however, was not so distributed, nor so holden—all was not seized by the conquerors, such of the ancient Inhabitants, as were allowed to remain in the country, kept their estates as they held them before; many, also, of the invaders, who were not yet attached to any particular chieftain, took possession of vacant Lands and enjoyed them in the same manner,(1) and there were some, even among the soldiery, who considering the portions which fell to their lot, as recompences due to their valour, and as settlements acquired by their own swords, took and retained possession of them in full property as freemen.(2) From these causes, there were many estates which were allodial, which the possessors enjoyed in their own right and did not hold of any superior Lord, to whom they were bound to do homage or perform service.(3) Every tenant of this description was called *liber homo* in contradistinction to "*vassalus*," or one who held of a superior,(4) yet they were not, by any means, exempt from the service of the state—they were subject to the command of the Dukes, or Governors of Provinces, and the Counts, or Governors of Towns, who were officers of the King's appointment; and the duty of personal service was considered so sacred, that they were prohibited from entering into holy orders, unless they had obtained the consent of the Sovereign. (5)

At their first incursions, the Barbarians, like the aborigines of Gaul, were governed by traditional customs. Their manners were uncivilized; war and hunting, were the only subjects of pursuit in estimation, and, as they had no fixed habitations, no other property than cattle, their common disputes arose either from personal quarrels or acts of depredation.

(1) Dalrymple, p. 10 & 11.
(2) Robertson's Charles V. vol. 1st. p. 214. Lefevre de la Planche Traité du Domaine, vol. 1st. p. 117 & seq.
(3) Robertson's ibid. vol. 1st p. 214.
(4) Robertson's ib. p. 216. Dalrymple, p. 10 & 11. Cust. of Paris, art, 182
(5) Capitular's Liber. 1st sec. 114.

dation. These were usually decided in public meetings of the people, held annually, at the close of winter, in general upon the information of witnesses, but in doubtful cases, by the ordeal of fire or water, or by combat. (1)

The polished minds of Romans, found nothing worthy of imitation in such conquerors—but the conquerors, savages as they were, perceived much in the Romans, which they could not but admire. They particularly viewed a written Code of laws as a novelty possessed of many advantages, and, not only permitted the Roman Jurisprudence to survive the destruction of the Roman Government, but, in imitation of what they approved, reduced their own usages to writing, particularly the Salique Law, which was the peculiar Law of the Franks. (2) The Theodosian Code, and the Laws, Customs and usages of the Barbarians, became, therefore, equally the Laws of France, (3) and as all Laws were held to be purely personal, and were not, for this reason, confined in their operation to any certain District, the Barbarian was tried by the Law of his tribe, the Roman by the Roman Code, the children followed the Law of their Father, the wife that of her husband, the widow came back to that to which she was originally subject, and the freedman was governed by the Law of his Patron. (4) Yet, notwithstanding these general provisions, every Individual was permitted to make election of the Law by which he chose to be governed, it was only required that he should make it publicly. and such elections were frequent. (5) The Clergy, in particular, who were chiefly Romans, considered the privilege of being governed by the Roman Law to be so valuable, that when any person entered into holy orders it was usual for him to renounce the Law to which he had been

(1) Fleury, p. 12 & 13.
(2) Fleury, p. 21.
(3) Esprit des Loix, Liber. 28, cap. 4, vol. 2 p. 240.
(4) Esprit des Loix, Liber. 28, cap. 2.
(5) Esprit des Loix, Liber. 28, cap. 2d. Fleury, p. 18.

been formerly subject, and to declare that he would, from henceforth, be governed by the Roman Code. (1) Many customs, also, peculiar to the victors, were continued after the conquest of Gaul. It had, particularly been their practice to meet in council, at the close of every winter, upon the state of their respective nations; and during the first and second Dynasties, several meetings of the Sovereign and of the Chiefs, in church and state, with the addition of the commons (from the reign of Charlemagne) were held, in the open air, annually in the month of March or May, and from thence denominated *champs de mars*, or *champs de mai*.(2)

In these Assemblies, Laws were passed for the government of the Kingdom at large, and Canons established for the regulation of the Church—Taxes were imposed—Regencies were appointed, and the Sovereign elected until the Crown became hereditary, and then, the Successor was proclaimed, if his right to the Throne was not controverted, and, if it was, it was solemnly determined.(3) The question on each subject of discussion was generally propounded by the King, who. when it had been fully debated, pronounced the definitive resolution. The result was then put into writing, the questions and resolutions which were passed upon them were reduced under distinct heads, called chapters, and to collections of several chapters was given the name of Capitulars.(4)

It is certain that a supreme jurisdiction over all persons, and all causes, was exercised by the Assemblies of the Champ de Mars, but the precise extent of that Jurisdiction, which was originally vested in the subordinate Courts of the Crown, or of the feudal Lords or Seigneurs, cannot now be determined.

(1) Robertson's Charles V. vol. 1st. p. 315.
(2) Fleury, p. 39.
(3) Encyclopedia Method. de Jurisp. verbo "Champ de Mars," vol. 1st. part 2d. p. 443, Robertson's Charles V. vol. 1st. p. 167.
(4) Fleury, p. 40.

mined.(1) It appears, however, from the learned researches of a modern writer,* to have been a fundamental principle of the French Monarchy, that every person who held a military command in chief, was, of right, entitled to a civil Jurisdiction over all whom he led to war.(2) Justice, therefore, was distributed by every feodal Seigneur to his vassals, within the limits of his Fief, whether he was a layman or an ecclesiastic, for he led them in person against the enemy, if he was a layman, and by his substitute (advocatus) if he happened to be an ecclesiastic,(3) and, upon the same principle, the *Liberi* or tenants of allodial estates who were led to war by the Dukes and Counts were subject to *their* jurisdiction.(4) The rule of decision, however, in every court was the general Law of the state, and the King, being the acknowledged head of the Government, in all matters, civil and military, all proceedings were in his name.(5)

The Dukes, the Counts and the Seigneurs, in their respective jurisdictions, originally decided causes in person, (6) but they, afterwards, entrusted this part of their duty to others. The officer who was appointed for the purpose by a Seigneur, was sometimes, called a *Seneschal*,† but, most commonly, a Bailiff which, in the language of those days, imported a guardian or protector of Justice, (7) and those who were named by the Dukes and Counts, were called Viscounts,

(1) Robertson's Charles V. 1st p. 304. *Montesquieu.

(2) Montesquieu, lib. 30, cap. 18—Répert. 8vo. vol. 25, p. 6. Loyseau des Seigneuries, cap. 1st sect. 72 and 73.

(3) Montesquieu, liber 30, cap. 17, vol. 2d. p. 377.

(4) Montesquieu, lib. 30 cap. Repert. vol. 6, p. 8—8vo. edit.

(5) Montesquieu, lib. 30. cap. 17.

(6) Dictionaire de Jurisprudence, vol. 3. p. 18. col. 1.

†The title of Senechal imported "an officer of the household"—Viscounts were said to be "quasi comitum vicem gerentes"—Prevosts "quasi præpositi juredicendos—Viguieres "quasi vicarii comitum."—and Chastelans "quasi castrorum custodes."—Loyseau de l'abus de Justice des Villages p. 6. quod vide.

(7) Ency. Method. verbo "bailiff," vol, 1. p. 710. Dict. de Droit, verbo "bailiff" Loyseau de l'Abus de Justice des Villages, p. 6, and Loyseau des Offices, p. 4. & p. 349.

Viscounts, Prevosts, Viguiers and Chastelains.(1) But in all their Jurisdictions, an usage, which derived its origin from the forests of Germany, was continued. Neither the Dukes, the Counts nor the Seigneurs, nor any of their officers decided alone: They assembled in their courts a kind of assize composed of their vassals, to the number of twelve,(2) who were, principally, the officers of their respective courts, and by those persons (who as vassals were the equals of the parties whose causes were there tried and thence called Peers) the judgment was pronounced according to the opinion of the majority, unless there was an equal division of voices, when, in criminal cases, it was given for the accused, and, in cases of Inheritance, in favour of the Defendant, subject always to an appeal to arms, and an ultimate decision by judicial combat.(3)

The feudal system is well calculated for defence, but not for the support of order.—In theory it is founded in subordination, but in practice it has been found universally to have diminished the power of the Sovereign, while it increased that of the greater vassals. This was particularly the case in France, where the Seigneurs, at a very early period of the monarchy, began to usurp the rights which had, till then been deemed the distinctions of Royalty, and with such advantage, in consequence of the weakness of the Kings of the second race, and the anarchy into which the Kingdom was thrown by the depredations of the Hungarians and Normans(4), during the ninth and tenth centuries, that the very dependants of the Crown, the Dukes, the Counts, and even the inferior officers of the State, were induced, by their example, to adopt the same conduct; they combined together, and, about the period at which Hugh Capet, the first of the third race, took

(1) Loyseau de l'Abus de Justice des Villages, p. 6.
(2) Montesquieu, book 30, cap. 18. vol. 2. p. 381 & 382.
(3) Montesquieu, Book 28, cap. 23, 24, 25, 26 & 27.
(4) Fleury, p. 47.

took possession of the Throne, were completely successful. They made hereditary, in their families, the lands, titles and offices, which, before, they had enjoyed for life only. They usurped the sovereignty of the soil, with civil and military authority over the inhabitants. They granted lands to their immediate tenants, who granted them over to others by sub-infeudation, and, although they professed to hold their Fiefs from the Crown, they were, in fact, independent. Strong in power, they exercised, in their several territories, every Royal prerogative.—They coined money—fixed the standard of weights and measures—granted safeguards—entertained a military force—imposed taxes—and administered justice in their own names, and in Courts of their own creation, which decided ultimately in all cases, civil and criminal, not according to the written Laws of the Kingdom, but according to the unwritten customs and usages of the District over which they respectively claimed and exercised Jurisdiction.(1)

By these usurpations of the Seigneurs, the foundations of the ancient laws of France were gradually undermined. But the demolition of this venerable fabrick was greatly promoted by the profound ignorance which pervaded the Kingdom during this period. Few persons, except ecclesiastics, could read, and, hence, the Theodosian Code—the Laws of the Barbarians, which had been reduced to writing, and the Capitulars sunk imperceptibly, but equally, into oblivion. The clergy also furthered its destruction by adopting, in their jurisdictions, the Canon Law which they had begun to compile early in the ninth century, and the Crown completed it by the publication of the ever-memorable Edict of *Pistes*, so called from the City of Pistes, where it was promulgated in the year 864, by Charles the Bald, one of the weakest of the weak descendants of Charlemagne. By this Edict, in the mistaken policy of conciliation, the unwritten usages of each

(1) Fleury, 51 & 52—Hargraves' Notes on Coke's Littleton, p 366, a.

Seigneurie were ratified and declared to be Law; a declaration which may be considered not only as the efficient cause of the final extinction of the ancient Law, but of the permanent establishment of that infinite variety of customs, which obtained in France until the late Revolution(1).

The authority of the Crown of France, at its ultimate point of depression, about the close of the tenth century, was merely nominal, the Royal Jurisdiction being confined to the Royal Domaine, which comprehended no more than four cities, in which the King was obeyed as feudal Lord, and not as Sovereign(2); on the other hand, the power of the Seigneurs at this epoch was enormous—their tyranny exorbitant.—The whole country was laid waste by the wars which they waged against each other, and their own vassals were reduced to an actual state of slavery, under the denomination of *serfs* and *hommes de poite,* or under the pretended rights of personal service and *corvé*, were treated as if, in fact, they had been reduced to that wretched condition(3). By this state of anarchy those who were yet in the possession of allodial property, were, in the first instance, induced to annex what they held to the Jurisdiction of some Fief, and to subject themselves to feudal services, for the immediate safety of their persons and the defence of their estates, and so generally was this the case that it gave rise to the maxim "*nulle terre sans Seigneur*," which at length, became the universal Law of France.(4) But as the Seigneurs could not, in every instance, protect their dependants against the Incursions of their neighbours, and as the feudal burthens were, in themselves, insufferable, many vassals abandoned their Lords, by degrees, and sought protection in walled towns where

(1) Montesquieu, Lib. 28. cap. 4. vol. 2d p. 243.
(2) Robertson's Charles V. vol. 1st. p. 366.
(3) Dictionnaire de Jurisprudence, vol. 3d. p. 16 and 17.
(4) Robertson's Charles V. vol. 1st. p. 223—Dict. de Jurisp. vol. 3, p: 16—Fleury, p. 61—Robertson ibid, p. 16.

where they united and entered into armed associations for mutual defence.(1)

These associations, which began during the reign of "Louis le Gros," about the year 1109, & were called "communes," could not long remain without some government; regulations, therefore were made, and usages adopted by each commune for the control of its subjects, and being asylums for all who where inclined to be peaceable, and barriers against the common enemy (the Seigneurs) the crown afforded them every assistance in its power—conceded to them the right of enacting Laws for their own internal Government and enfranchised the Inhabitants.(2)

The seigneurs plainly saw that the Institution of communes was adverse to their interest, yet they could not prevent the increase of such associations; they even found themselves compelled to have recourse to the same expedient to prevent their dependants from taking refuge in the royal cities which were incorporated: many of the towns, also, within their territories, were willing to purchase charters of liberty, and as most of the seigneurs had expended large sums in the holy wars, and were needy, they sold them as a means of present relief. From hence, in less than two centuries, most of the towns in France, from a state of dependence, became free corporations, and personal servitude was generally abolished.(3)

The effects of these establishments were very soon felt; they were found to afford a degree of security equal to that which was afforded by the seigneurs, who began to be of less importance when they ceased to be the protectors of the people. The *communes* themselves became attached to their sovereign, whom they considered as the author of their liberties, and they looked to the Crown as the common centre of union, necessary for the defenee of the whole against their oppressors.

(1) Dict. de Jurisp. vol. 3d. p. 17.
(2) Dict. de Jurisp. vol. 3d p. 17. Réper. vol. 13. verbo "commune."
(3) Robertson's Charles V. vol. 1st. p. 33. 227 & 251.

oppressors.(1) On the other hand, the sovereign considered them as instruments which might, with great advantage, be employed to increase the Royal Prerogative. To this end, they endeavoured to raise them to importance, and, with consummate policy, called them to assist, by their Deputies, in the States General of the nation. Availing themselves, also, of their co-operation, under the idea of restraining the power of the seigneurs, they laboured in the great design of restoring to France her ancient limits, and to the Crown its original Jurisdiction. From time to time, as opportunities occurred, they reunited the dismembered Provinces to the Royal Domain, and reduced them to immediate dependence by conquest, by escheats and by treaties, (2) they abolished private warfare and judicial combats, and extended the administration of Justice, under the royal authority, to all persons, and to all causes,(3) by steps of which the most effectual shall be more particularly noticed.

Before, and during the reign of Charlemagne, Justices in Eyre of the royal appointment, under the title of "*Missi Dominici*," visited, occasionally, the different Provinces, chiefly for the purpose of investigating the conduct of the Dukes and Counts in the several Jurisdictions, civil and criminal, which they exercised under the authority of the Crown, which was sometimes greater, and sometimes less, as the sovereign was more or less feared and respected.(4) Louis the VI. about the year 1125, attempted to revise the office of the "Missi Dominici," under the title of *Juges des Exempts*(5), but the seigneurs were in his time too powerful, and

(1) Robertson's Charles V. vol. 1st p. 34.

(2) This design was ultimately completed in 1735, by the re-union of the Provinces of Bar and Lorraine—Vide Abrégé Chronologique des grands Fiefs de la Couronne de France, Paris 1759, and Hargrave's Note on Coke and Littleton, 366 b.

(3) Loyseau des Seigneuries, cap. 5. sec. 63. Delolme, p. 17. Robertson's Charles V. vol. 1st. p. 36 & 56.

(4) Répert. 8vo vol. 40, p. 180 verbo "Missi Dominici." Du Cange verbo « Dux,» « Comites,» et « Missi.»

(5) Reper. verbo «Missi Dominici,» vol. II. p. 573.

and he was obliged to abandon his intention.(1) His successors had recourse to expedients less alarming.—Among the first, certain cases in which the King was interested, or presumed to be interested, were declared to be "Pleas for the Crown," or "*Cas Royaux*" which, according to feudal principles, (he being the Lord paramount) could not be dicided by the officer of his vassal, and were therefore cognizable in the Royal courts exclusively. To this distinction, the seigneurs of inferior note submitted, but it was scorned by the more powerful, who, relying upon their strength, continued to exercise Jurisdiction over all cases. The attempt, however, even with respect to the latter, was productive of benefit; it turned the attention of the vassals to courts distinct from those of their oppressors, and taught them to view the sovereign as a protector, and this facilitated the subsequent introduction of Appeals, by which the decisions of the seigneurial courts were brought under the review of the Royal Judges.(2) Of these the Appeal "*de défaut de droit,*" on account of the delay or refusal of Justice, was the first. The feudal law had provided that if a Seigneur had not as many vassals as enabled him to try, by their peers, the parties who pleaded in his Court, or if he delayed, or refused to proceed to trial, the cause might be carried by appeal to the Court of the superior Lord of whom the Seigneur held, and be there tried (3) The right of Jurisdiction had been usurped by many inconsiderable Seigneurs who were often unable to hold Courts, for want of Officers and Vassals, and while trials by battle continued in use, there were times, and cases, even in the Courts of the greater Seigneurs, in which it was difficult to assemble the Peers, by reason of the danger to which they were exposed, by their being liable to appeals, by either party,

(1) Hénault's Abrégé Chronologique, tome 2d p. 730.
(2) Robertson's Charles V. vol. 1st. p. 60, 61.
(3) Beaumanoir, cap. 62, p. 322. Esprit des Loix, Lib. 28, cap. 28.

party, on account of false judgments, which necessarily led to the hazard of a personal combat, if they maintained their opinion.(1) In all such cases Justice was delayed, and there were, therefore, frequent occasions for appeals of this description, from whence the practice became familiar, and served as an introductiou to appeals on account of the "injustice" or "iniquity" of the sentence, which followed, and gradually increased, as the trial by combat declined, for that mode of trial being, in fact, an appeal to the Deity, and the issue of the battle, held to be a decision by his immediate interference, was incompatible with a new judgment of any kind.(2)

To facilitate Appeals, and the recourse of the subject to the Royal authority, Judges, under the title of "*Grand Baillis*," were appointed in all the cities of the Royal Domaine, with an Appellate Jurisdiction over all causes, civil and criminal, heard in the Seigneurial and in the Royal (but inferior) Courts of Prevôté(3), which was final, except in certain cases of importance, which they were required to transmit to the King, to be decided by himself in his Council, where they were ultimately determined.(4) The number of these Jurisdictions, at their first creation, was inconsiderable, but in the reign of Philip Augustus, about the year 1190, they were numerous.(5)

A regulation of greater importance succeeded the institution of the Grand Baillis. The King's Supreme Court of Justice, or Council, in which he presided, which, as in all other feudal Kingdoms, was originally ambulatory, following the person of the Monarch, and held only upon some of the

(1) Montesquieu, Lib. 28, cap. 27, vol. 2d. p. 282 & seq. Robertson's Charles V. vol. 1st. p. 306.

(2) Robertson's Charles V. vol. 1st. p. 61.

(3) Dict. de Jurisp. vol. 3. p. 18. Dict. de Droit, verbo "Baillis," vol. 1, p. 166, col. 2d.

(4) Ency. Method. de Jurisp. verbo "Baillis," vol. 1st. p. 710.

(5) Dictr. de Jurisp. vol. 3d, p. 18. Fontanon, Lib. 1st. Tit. 1st. p. 179. Dictr. de Droit, vol. 1. p. 168.

the great festivals, was rendered sedentary at Paris, and appointed to be kept open the greater part of the year, under the appellation of the "*Parlement de Paris.*" This was effected by an Ordinance of Philip le Bel, passed in the year 1302, and emphatically entitled "*Ordonnance pour le bien, l'utilité, et la réformation du Royaume.*"(1)

This Ordinance erected, also, a Sovereign Court of Assize, at the City of Troyes, in Champagne, under the title of "Grand Jours," re-established the Parliament of Thoulouse, a Court before held under the authority of the Counts of that Province, and confirmed a Court of Exchequer at Rouen, which had subsisted since the re-union of that City to the Crown of France, in the year 1200, and was originally created by the Court of the Peers of France, by which John, King of England, was, by default, convicted, as a vassal of France, of the murder of his nephew Arthur.(2) Other Sovereign Courts of Parliament, making in all thirteen (*a*), were afterwards erected in the several Provinces of the Empire.(3)

To the several Royal Courts, when established, the people were invited to have recourse for redress, by every means which policy could devise. The Monarchs named Judges of abilities and legal acquirements—they added dignity to their character, and splendor to the administration of their office. To the Parliaments, which were the most respectable, and to the presidial Courts, which were established for their assistance, they granted the right of deciding, ultimately, in Appeal; and to the Baillis, whose judgments thus became liable to reversion, an original Jurisdiction which, before, they did not possess.(4) They appointed a number of Counsel-

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(1) Conférence des Ordonnances, by Bouchel, p. 137.
(2) Dictr. de Jurispr. vol. 3. p. 21 & 22. Ord. de Louvre, Tom. 1, p. 366.
(*a*) Paris, Thoulouse, Grenoble, Bordeaux, Dijon, Rouen, Aix, Rennes, Pau, Mely, Besançon, Douai, Nancy.—See Répert. vol. 44. p. 296, verbo "Parlement," and Dictr. de Droit, verbo Parlement.
(3) Répertoire, 8vo. vol. 44. p. 296.
(4) Dictr. de Droit, verbo Baillis.

lors or Members in each Parliament to assist the President,(1) and, in imitation of the Seigneurial Courts and those of the Dukes and Counts, in which the suitors had been accustomed to the trial by peers, they required the Baillis to summon to their assistance, a certain number of discreet persons (*prodes homines,*) and to decide according to their counsel and advice.(2) The people also were permitted, in the dialect of the times, "*de veignir à la Cort du Roi, par ressort, par appel, ou par defaute de Droit, ou par faux Jugement, ou par recréance nie, ou par Grief, ou par veer le droit de sa Cort,*"(3) and, under the sanction of this authority, the Royal Judges took advantage of every defect in the rights of the Seigneurs, and of every error in their proceedings, they brought before them, in their respective Jurisdictions, all causes which it was possible for them to remove, and held cognizance over all which it was possible for them to retain, at the same time, they laboured to render the practice of their Courts regular, and their judgments consistent, by which means they ultimately obtained the confidence of the people, and were generally respected. Suitors then began to abandon the Seigneurial Courts, (in which the will of the feudal Lord was, but too frequently, the Law by which the case of his vassal was decided,) and took refuge in the more discerning and more equitable Tribunals of the Crown.(4) The King was again universally recognised to be the source of Justice, and the Seigneurs were deprived of every Jurisdiction to which they could not shew title, derived by grant from the Crown.(5)

The ecclesiastics, who, in the reign of Charlemagne, were altogether subject to the temporal power(6), had, in common

(1) Répertoire, verbo "Parlement," vol. 44, p. 294.
(2) Montesquieu, Liber. 27, cap. 42, vol. 2. p. 320.
(3) Etablissemens de St. Louis, cap. 15, lib. 2. Ordonnances des Rois de France, de l'Imprimerie Royale, Tom. 1. p. 107. Dict. de Jurispr. vol. 3d. p. 21.
(4) Robertson's Charles V. vol. 1st. p. 309.
(5) Bacquet's Droit de Justice, vol. 1st. p. 9 & 10.
(6) Loyseau des Seigneuries, chap. 15, sec. 29 to 39.

mon with the Seigneurs, taken advantage of the disorders which prevailed, and of the superstition of the age, not only to enlarge their own peculiar Jurisdictions, but to shake off, entirely, their subjection to all authority, except that of the Church. They had, in fact, so multiplied their pretexts for extending the Jurisdiction of the Spiritual Courts, that it was, ultimately, in their power to withdraw almost every person, and every cause, from the cognizance of the Civil Magistrate.(1) They claimed and exercised, as their exclusive privilege, the right of deciding all civil causes, in which any of their body was a party, or was, in any manner, interested, and all criminal prosecutions, in which the defendant either was, or asserted himself to be, a Clerk; in causes where none but laymen were concerned, they claimed and exercised a similar privilege for various extraordinary reasons—in matters of contract, because contracts were then usually enforced by the oath of the parties—in all testamentary cases, because the deceased having left his body to the Church for Sepulture, the execution of his Will, by the Church, was a necessary consequence, inasmuch as it concerned the repose of his soul(2)—in all matrimonial cases, because marriage was a Sacrament—and in all cases in which a widow or an orphan was a party, because it was the duty of the Church to protect such characters. In other cases the same privilege was claimed for reasons which were not less extraordinary. If an individual resisted their authority, he was excommunicated, and upon his submission, a pecuniary fine was imposed for reconciliation with the Church, which the temporal Judge, in whose Jurisdiction he resided, was required to enforce by his authority, under pain of personal excommunication, and the interdiction of the whole District over which he presided, in case of disobedience.(3)

‡ ‡ The

(1) Robertson's Charles V. vol. 1st. p. 112. Fleury's Institut. du Droit Canon, vol. 2. p. 8. Hericourt, part 1st. p. 120.
(2) Loyseau des Seigneuries.
(3) Fleury's Institut. du Droit Canon. vol. 2. p. 9 & 10.

The first attempt, by the King's Courts, to reduce the exorbitant pretensions of the Clergy, was the appeal "*de Deni de Justice,*"(1) which was similar to the appeal "*de Défaut de Droit.*" This was daily extended, by construction, to a great variety of cases, and was followed by the "*Appel comme d'abus,*" which, in the nature of a prohibition, suspended all proceedings, and was allowed, at any stage of a cause,(2) to all who complained, that the Judge of the Spiritual Court had exceeded his authority by any proceedings, contrary to the Canons of the Church, *recognized in France,* or to the Law of the Land in any respect.(3) This remedy was in practice long before the year 1539, but in that year it was formally declared to be the Law of France, by an Ordinance of Francis the First "*pour la réformation et abréviation des Procès.*"(4) By this Ordinance the Ecclesiastical Judges were also forbid to cite before them any of the King's lay subjects, in any matter whatever, except those which were strictly Spiritual, and the King's lay subjects were forbid to institute any suit, of a temporal nature, before any Court of Ecclesiastical Jurisdiction.(5)

Thus the Crown of France, by persevering in one great plan, with indefatigable exertion, and continued prudence, suspending its attempts when the conduct of the Clergy, or any formidable conspiracy of the greater Seigneurs, required it; and resuming them when they were feeble or remiss, became once more the Fountain of Justice. That part of its original Jurisdiction, over causes and persons, which the Clergy and the Seigneurs had usurped, was regained, and the entire proceedings of the Seigneurial and Ecclesiastical Judges, in all causes, civil and criminal, spiritual and temporal, which were

(1) Dict. de Jurisprudence, vol. 1st. p. 292.
(2) L. C. Dénizart's Preliminary Discourse to vol. 1st. p. 73.
(3) Fleury's Institut. du Droit Canon. vol. 2d. p. 12.
[4] Dictionnaire de Jurisprudence, vol. 1st. p. 297. Traité de l'Abus, vol. 1st. cap. 2. p. 11. ed. of 1778.
[5] Ordonnances de Neron, vol. 1st. p. 162. Loyseau des Seigneuries, cap. 15. sec. 75, 76 & 77.

were legally subject to their inquiry, were brought before the review and control of the Sovereign, through the medium of his Courts.

Upon the re-establishment of the Royal authority, the local customs of France were so numerous and so various, that there were not two Seigneuries, throughout the whole Kingdom, entirely governed by the same Law.(1) Some of the causes of this amazing diversity have been traced in the different usages of the Barbarians, which were introduced by the original conquest of Gaul---in that peculiar principle of their Jurisprudence, which permitted each individual to make choice of the Law by which he thought proper to be governed, and the consequent existence, not only of the customs of each particular tribe, but of the Theodosian Code, especially among the Clergy—in the introduction of the feudal system, and the distinctions which it created between feudal and allodial property—in judicial combats which were necessarily introductive of new usages created by their several and various issues—in the usurpations of the Seigneurs, the means which they, severally, adopted to support them, and the independent administration of Justice within the limits of their respective Jurisdictions—in the Ordinances enacted by the Sovereign for the government of the Royal Domaine—in the establishment of Communes and their bye-laws—and in the compilation of the Canon Law, and its general application to all questions decided by Ecclesiastics. But to these causes must be added the discovery of the Justinian Code, which was brought from Italy into France about the middle of the twelfth century,(2) and soon affected her Jurisprudence in various gradations :—In some of the Provinces it was entirely adopted and confirmed, and declared, by the Royal authority, to be exclusively their Common or Municipal Law. In others it was received as subsidiary to their own

(1) Montesquieu, Lib. 28, cap. 45.
(2) Idem, Lib. 28, cap. 42. Robertson's Charles V. vol. 1st. p. 316.

own local customs, as a rule of decision in cases for which they had not provided; but in the greater number it mingled imperceptibly with their usages, and had a powerful though less sensible influence.

To the revival of the Roman Law must, also be attributed the decline of the Trial by Peers and by the *prodes homines.* The duties of both were, originally, similar and required neither capacity nor study. They decided upon the usage and custom of the people and place to which they belonged, and a knowledge of these was all which it was necessary for them to possess. But when the Institutes and digest of Justinian were translated and publicly taught, the proceedings in the different Tribunals were materially changed. Learning among the laity was totally unknown—but the clergy having some information, and being in possession of all the offices in the different Courts, eagerly adopted the practice of the Roman Law. A new form of Trial was thus introduced, which was no longer an exhibition of state, grateful to the Seigneur and interesting to a warlike people, but a dry course of pleading which they neither understood nor cared to learn, and upon which the Judge was soon left to give judgment alone, for the Peers and the "*prodes homines,*" being no longer capable of deciding, withdrew by degrees, and were succeeded by Lawyers, who were appointed to assist the Judges with their advice, under the title of *Assessors.*(1)

The Royal Judges, upon their re-establishment, were greatly embarrassed by the different local customs to which, in the administration of Justice, they were compelled to have recourse, and upon which, by the secession of the Peers and *prodes homines*, they found themselves obliged to decide in person. It was impossible for them to have a knowledge of the usages of each particular Seigneurie, and, therefore, in all cases in which any question arose respecting the existence of a custom, or of the practice which had obtained under a

(1) Montesquieu, Book 28, cap. 42, vol. 2d. p. 319 & 320.

particular custom, there was an absolute necessity for a recourse to parole testimony, by which means all questions of Law became mere questions of fact, in which he who held the affirmative was required to prove what he asserted, by the production of ten witnesses at least.(1)

In such an enquiry, which was called an "*Enquête per turbes,*" so much depended upon the influence and industry of the suitors, and upon the experience and integrity of the witnesses, that it was, at all times, difficult to come to the truth, especially when evidence was adduced by both parties; in such cases equal proof was sometimes made of two customs, in direct opposition to each other, in the same place, and upon the same fact.(2)

The reduction of the whole to writing was pointed out, by reference to the Roman Law, as an effectual remedy for these evils, and was adopted. At first the usages of certain Bailiwicks were collected by individuals:—Pierre Desfontaines (the earliest writer on the Law of France,) published his "*Conseil,*" which contains an account of the customs of the country of Vermandois, and Beaumanoir, the "*Coustumes de Beauvoisis,*" during the reign of St. Louis, which began in the year 1226.(3) These works were followed by others of the same description,(4) and by one of a public nature, "*Les établissemens de St. Louis,*" which contained a large collection of the Law and customs which prevailed within the Royal Domaines, and was published by the authority of that Monarch.(5)

The compilations of individuals could have no weight in the King's Courts, except what they derived from the truth and notoriety of the subjects upon which they wrote; yet it cannot

(1) Fleury's Hist. du Droit François, p. 85, Ferrière's gd. Com. vol. 1st. p. 5, sec. 2, art. 1.
(2) Fleury's Histoire du Droit François, p. 85.
(3) Robertson's Charles V. vol. 1st. p. 317.
(4) Montesquieu, Lib. 28. ch. 45. vol. 2d. p. 324.
(5) Dictionnaire de Jurisprudence, vol. 3.

cannot be doubted that they contributed greatly to those redaction of the customs which were afterwards made under the sanction of the Sovereign. In 1302, Philip the IV. directed the most intelligent inhabitants of each bailiwick to be assembled for the purpose of informing his Courts of the customs which had been observed in their respective Jurisdictions, and required his Judges to register and observe those which should be worthy of approbation, and to reject all which should be found unreasonable, and this command was carried into execution in several parts of the Kingdom.(1)

Charles the VII. conceived the idea of digesting the several customs into one general code for all France, and to this end, by the 125th article of the ordinance of 1453, (2) usually called the ordinance of *Montils le Tour*, he directed the several customs and usages of each Jurisdiction to be written, but nothing further was done, until the year 1495, when the custom of Ponthieu was reduced to writing under Charles the eighth. His successor, Louis XI, is represented, by the Historian, Philip de Commines, and by Dumoulin, to have been very desirous of having "*one custom, one weight, "and one measure, throughout his Kingdom, and that every "Law should be fairly enregistered in the French language;*" (3) yet it does not appear that any of the customs were compiled during his administration of the Government, but in the reigns of the succeeding monarchs, particularly Louis XII, Francis the I, and Henry the II, many were finished, and the whole, comprehending sixty collections of general customs, in force in the several Provinces, and about three hundred local customs, in force in the different Cities and Bailiwicks of the Kingdom, were completed under Charles the IX, after the expiration of the century from the commencement of the design.(4)

In

(1) Dénizart, vol. 1. p. 575, 9th edit.
(2) Ordonnances de Neron, vol. 1st. p. 43.
(3) Dictionnaire de Jurispr. vol. 3d. p. 47. Fleury, p. 68.
(4) Fleury's Hist. du Droit François, p. 69. Reper. verbo « Coutumes, » vol. 16, p. 390.

In the execution of the edict of Charles VII, the States General of each Province, consisting of the deputies of the nobles, the ecclesiastics and the representatives of the commons, were convoked by the royal letters patent, issued for that purpose. By them, when assembled, an order was directed to all the Judges and other Royal Law Officers of the Province, requiring them to transmit to the States General, reports of all the customs and usages practised in their respective Jurisdictions, from time immemorial. These reports were referred to a special committee of the States General, by whom they were reduced to abstract maxims, arranged in order, and so returned to the States General by whom they were examined, confronted with the original reports, discussed and accepted or rejected.(1) Those which were accepted, being confirmed by the King, enregistered and published in the sovereign Court of the Jurisdiction to which they related,(2) became the Law of that Jurisdiction, binding upon its inhabitants, but in no way affecting the rights or prerogatives of the Crown,(3) and subject, at all times, to any alteration which the King might think proper to make by a royal ordinance.(4)

The redaction of the Custom of Paris was among the first. In 1510, Louis the XII. published a general edict, in which, after reciting, that a fixed rule in the administration of Justice was absolutely necessary for the happiness of a state, & that no Government could exist without it; and declaring himself to be well acquainted with the great vexations, delays

(1) Fleury's Hist. du Droit François, p. 70.

(2) Loyseau des Seigneuries, ch. 3. sec. 11. Ferrière, pet. Com. v. 1 p. 5.

(3) Bacquet Droit de Justice, ch. 10, No. 8. Droit d'Aubaine, ch. 29, no. 2. Droits de Francs Fiefs, ch. 11. No. 5. Som. Seule.— Brodeau sur Paris—Tronçon sur Paris, art. 75.—Galland, Traité de Franc aleu, ch. 8—Ferrière gd. Com. v. 1, p. 9, sec. 10—D'Aguesseau, vol. 7. p. 302 & 363, & vol. 8, p. 152, & 153. Case of Rex and the Duke and Dutchess de Vanquinon, decided 5th August, 1762, and reported in Ferrière, D. D. verbo "Coutumes," vol. 1, p. 424, edit. of 1771 & in the Dict. des Domaines, vol. 2. p. 479.

(4) Brodeau sur Louet, letter D. ch. 25—Ferrière, D. D. vol. 1st. p. 542, verbo "Droits Coutumiers."

lays and expenses to which his subjects had been, and yet were obliged to submit, in consequence of the confusion, obscurity and uncertainty which pervaded the customs of the different Provinces and Bailiwicks of his Kingdom; he commanded the whole to be collected in the manner directed by his predecessor, Charles the VII.(1) and by a royal commission of the same date, Thibault Baillet, President, François de Morvillier, Counsellor, and Roger Barme, Attorney-General in the Parliament of Paris, were authorized to call together the Counts, Barons, Chastelans, Seigneurs, Prelates, Abbots, Chapters, King's Officers, Advocates and Attornies of the city, prevoté and vicomté of Paris, with a certain number of respectable citizens, and to lay before them the Custom of Paris, as it had then been reduced to writing, in an assembly of the three estates, (which had been previously held for that purpose,) for such alterations as this new assembly of officers and citizens, upon discussion, should find requisite.(2) This was, accordingly, done, and some changes were made; and His Majesty having declared, in the edict above mentioned, that he sanctioned and approved whatever his commissioners and the three estates of any Province should, mutually, agree and certify to be the customs of that Province,(3) the whole, as it then stood, was enregistered and published in the Parliament and Chatelet of Paris, as the edict required, and, thereupon, became the Law of the Prevoté and Vicomté of Paris.(4) In this state it remained until the year 1580, when, in an assembly of the three estates, in which the celebrated Christopher De Thou, first President of the Parliament of Paris, by virtue of Letters Patent, issued for that purpose by Henry the

(1) Intr. to Ferrière, gd. Com. vol. 1. p. 51.
(2) Intr. to Ferrière, gd. Com. vol. 1. p. 33.
(3) Ibid. gd. Com. vol. 1st. p. 52,
(4) Vide Edict of 1510, in Introduction to Ferrière, grand Comment. vol. 1. p. 52, and the conclusion of the Procès Verbal of the Redaction of the Custom of Paris, ibid. p. 50.

the III. presided, it was reformed and amended, with all the formalities which were used at the original redaction; but it received no improvement or alteration of any kind after that period, and the several articles, as they were then corrected, continue, to this day, to be the text of the Custom of Paris.

Various attempts were made by succeeding Monarchs, particularly Francis the I, Henry the IV. and Louis the XIV to renew the great design of Charles the VII. for the Government of France by one general and uniform code of Laws, but never with success.—The customs were too deeply rooted in the pride and prejudices of the inhabitants of the districts in which they obtained, to be eradicated, and they prevailed, though the evils arising from such a discordant mass of Laws were most sensibly felt and frequently deplored;—"Our numerous customs," says an animated writer on the *Law* of France, "obscure and susceptible of any interpretation, "form a vast and eternal Labyrinth, in which the peace, "the happiness, the lives and fortunes of our citizens, the "very character and honor of Jurisprudence, are lost for "ever."(1)

The supreme legislative authority was, originally, vested in the assemblies of the Champ de Mars,(2), and, by them, it was exercised until the year 921, when the last of the capitulars was enacted, under Charles the simple.(3)

During the disorders which followed, the Sovereign and the great Vassals were influenced by motives, which, though extremely different, produced the same effect in the conduct of both, and equally prevented all acts of general Legislation. The weakness of the crown compelled the King carefully to abstain from every attempt to render a Law general throughout the Kingdom; such a step would have alarmed

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(1) Prost. de Royer, Dictr. de Jurisp. vol. 3. p. 37. Vide also the Preamble to the Ordinance of 1731.

(2) Robertson's Charles V. vol. 1. p. 166.

(3) Robertson, ibid, vol. 1. p. 367.

the Seigneurs—have been considered as an encroachment upon the independence of their Jurisdictions, and have led to consequences which might have proved fatal to the little remains of power which he yet retained. On the other hand, the Seigneurs as carefully avoided the enacting of general Laws, because the execution of them must have vested in the King, and must have enlarged that paramount power which was the object of all their fears. The general assemblies, or States General of the nation, thus lost or voluntarily relinquished their legislative authority, which, abandoned by them, was assumed by the Crown.(1)

The first of the royal ordinances, which can be taken for an act of Legislation, extending to the whole Kingdom, was published in the year 1190, by Philip Augustus, and is entitled "*Edit touchant la mouvance des Fiefs, entre divers Héritiers.*"(2) Previous to this period they contained regulations, whose authority did not extend beyond the limits of the royal domain, so that no addition whatever was made to the statute Law of France, during the long period of 269 years, which elapsed between the date of the last capitular, in the year 921, and the publication of this edict.(3)

The first acts of general legislation were published by the Kings of France with great reserve and precaution. They assembled a Council, composed of the great officers of the Crown, and of certain of the Bishops and Seigneurs, which is generally supposed to have been no other than the King's Council of that day, the Court of the Palace, which was afterwards made sedentary and called the Parliament of Paris.(4) With them they deliberated—with their advice and consent they legislated, and by them the ordinances were signed, as well as by the Sovereign himself.(5) But, in a later period

(1) Robertson's Charles V. vol. 1. p. 167 and 168.
(2) Conférence de Guenois Chronologique, p. 2.
(3) Robertson's Charles V. vol. 1. p. 368 and 167.
(4) Maximes de Droit Publique Françoise, vol. 4. p. 186.
(5) Miraumont des Jurisdictions de l'enclos de Palais p. 61.—Coquille, Instit. du Droit François, cap, 1.—Maximes du Droit Pub. Françoises, vol. 4. p. 184.

period, and by succeeding monarchs, these were considered as unnecessary formalities, and rejected. They, then, enacted laws in their own names, and alone—the style of persuasion, which was used in the earlier edicts, was changed for the imperative declaration of an absolute Legislator, "*voulons*, "*commandons et ordonnons, car tel est notre plaisir*," and for the deliberative voice of the council, was substituted the practice of verifying and enregistering the royal ordinances in the Parliaments or Sovereign Courts of those Jurisdictions to which the King thought proper to extend them; a practice which was continued, without deviation, until it became a fundamental maxim in French Jurisprudence, recognised, equally, by the Prince and by the People, that no Law could be published in any other manner, and that no ordinance could have any effect, or bind the inhabitants of any particular Jurisdiction, before it was verified and enregistered, by the King's order, in the Sovereign tribunal of that Jurisdiction.(1) Under the sanction of this maxim, the Parliaments of France, at various times, refused to verify and enregister particular ordinances which they conceived to be oppressive to the subject, or subversive of the constitution, with a spirit and constancy which reflected the highest honor on their members, but bore no proportion to the power which they opposed.—In some instances of their opposition, the King voluntarily abandoned the obnoxious Law; in others, the Parliament, on their part, thought it most prudent to submit, and obeyed the royal commands, contenting themselves with an entry, purporting that the enregistry was made by compulsion, "*ex iterativo et expresso mandato Regis.*"(2) But, whenever instances have occurred in which the

(1) Rocheflavin des Parlemens de France, liv. 13, cap. 17. No. 3. p. 702 Papon, troisième Note, tit. de la clause "car ainsi nous plait," p. 334 and 336—Pasquier, Recherches de la France, lib. cap. 4.—Loyseau des Seigneuries, cap. 3. no. 11.--Des Offices, lib. 4, cap. 5. No. 67--Coquille Inst. au Droit François, cap. 1st.—Hericourt, Loix Ecclesiastique, p. 108. cap. 16, sec. 10.—Maximes du Droit Public François, vol. 4. p. 57.

(2) Maximes du Droit Public François, vol. 4. p. 240 & sc. 1 q.

the Parliaments have inflexibly refused to enregister an ordinance which the King had determined to carry into execution, the plenitude of the royal power has afforded a remedy for their refusal. Upon such occasions, the King repaired, in person, to the Parliament and held a "*lit de Justice.*" He took possession of that seat, which he was *supposed* at all times to occupy, and commanded the ordinance to be read, verified and registered in his presence—for, being the Sovereign, and personally present, the Parliament was held then to have no authority, according to the principle, *adveniente principe, cessat Magistratus*, a principle which the constitution of France seems to have recognized, and which most effectually defeated every effort of her Parliaments to limit and control the Crown, in the exercise of a supreme legislative authority.(1)

"*Ordonnance*" is a generic term, comprehending, *in its most extensive* application, every rule of conduct prescribed by the Sovereign to his subjects *in person*, as the Royal Edicts, Declarations, and *Arrêts du Roi en son Conseil*, or *by his authority*, as the bye-laws of corporations and the Arrêts of his superior or Sovereign Courts.(2)

In a narrower sense, it signifies all laws which emanate from the King directly, and those only ;(3) but, in its most limited import, it is confined to such general laws as are enacted by the Sovereign in person, and are rather codes of regulations respecting one or more branches of Jurisprudence, than provisions for particular objects, and this is its proper signification.(4)

In this sense the ordinance of John the I. of March 1356; (5) one of Charles the VII. of July 1438, usually called the pragmatic

(1) Rocheflavin, p. 928 & 929—Pasquier's Recherches, vol. 2. p. 576, 577, and 1st. p. 61—Répert. "Lit de Justice," vol. 36. p. 529.
(2) Bornier's Preface, p. 2. Couchot, prat. Univ. vol. 1st. p. 4.
(3) Couchot, prat. Univ. vol. 1. p. 4.
(4) Bornier's Preface. p. 3. Hericourt, Loix Ecclésiastique, cap. 16, sec. 5, p. 108.
(5) Neron, vol. 1. p. 2.

pragmatic sanction ;(1) another of Charles VII. of October 1446 ;(2) another of the same monarch, of April 1453, usually called the ordinance of *Montil les Tours*.(3) The ordinance of Louis the XII. of March 1498 ;(4) that of Francis the I. of October 1535, commonly called the ordinance of *Yz sur Tille* ;(5) another of the same monarch of June 1536, usually called the edict of Cremieux ;(6) another of the same monarch, of the month of August 1539, commonly called the ordinance of *Villars Cotterets* ;(7) one of Charles the IX. of January 1560, commonly called the ordinance of Orleans ;(8) another of the same Monarch of January 1563, commonly called the ordinance of Rossillon ; (9) another of the same Monarch, of February 1566, commonly called the ordinance of Moulins ;(10) one of Henry the III. of May 1579, commonly called the ordinance of Blois.(11) The celebrated edict of April 1598, commonly called the edict of Nantes,(12) and that of Louis the XIII. of January 1629, better known by the names of Code Michaud and code Marillac,(13) are the principal ordinance enacted before the erection of the Sovereign Council of Quebec.(14)

The ordinance of January 1629, which is one of the most extensive and best digested, was enregistered in a "*Lit de Justice*," held in the Parliament of Paris, on the 15th January, 1629. It was compiled by Michel de Marillac, then keeper

(1) Guenois' Chronologie, p. 7.
(2) Neron, vol. 1. p. 17.
(3) Neron, vol. 1. p. 24.
(4) Neron, vol. 1. p. 56.
(5) Neron, vol. 1. p. 93.
(6) Neron, vol. 1. p. 152.
(7) Neron, vol. 1. p. 158.
(8) Neron, vol. 1. p. 368.
(9) Neron, vol. 1. p. 424.
(10) Neron, vol. 1. p. 444.
(11) Neron, vol. 1. p. 508.
(12) Neron, vol. 2. p. 921.
(13) Neron, vol. 1. p. 782.—Répertoire verbo "Code Michaud."
(14) Vide Dictr. de Jurispr. vol. 3. p. 39—Répert. verbo "Ordonnance," vol. 43, p. 470—Dénizart, verbo "Ordonnances."

keeper of the seals, by order of Cardinal De Richelieu, and was, at first, received with great approbation, which it well merits. But on the death of the Marechal de Marillac, who was brought to the scaffold by the Cardinal, the seals were taken from his brother, Michel, who was imprisoned, and died of a broken heart in the Castle of Chateaudrin in 1632.

The disgrace of Michel de Marillac affected the credit of the Ordinance of which he was known to be the author. It fell into general disrepute, and, certainly, for a period, was not cited in the Parliament of Paris. There were, however, even during that period, some Jurisdictions which continued to receive it, and in which it was quoted and admitted to be Law, particularly the Parliament of Dijon, and by some writers it is asserted, that it was finally received as such in all.(1) But by others this is denied, and the Ordinance is, by them, said to have become obsolete. *Non mihi licet tantas componere Lites.*

Much of the Ecclesiastical Law of France, as it stood at the erection of the Sovereign Council of Quebec, is contained in the Ordinances which have been enumerated.—They relate, in general, to the Government of the Church as well as of the State, and to the Jurisprudence and practice of Courts, Ecclesiastical as well as Civil. There are, however, others which wholly concern the Church, some enacted upon the representations of the States General—some upon the representations of the Clergy—and some upon the mere motion of the Sovereign.(2) But the principal Ordinance, on this head, is that of Charles the Seventh, of July 1438,(3) called the Pragmatic Sanction.

During the schism of Avignon, when, from the year 1378 to

(1) Journ. d. Aud. vol. 4. p. 486—Dictr. de Jurisp. vol 3. p. 44—Dénizart, verbo "Pareatis," No. 25—L. C. Dénizart, vol. 4. p. 586, case of the Princess of Carignant, an. 1748—L. C. Dénizart, vol. 9, p. 761—Répertoire, 8vo. vol. 11. p. 431 to 434—Encyclopedia Méthodique de Jurisprudence, vol. 2. p. 692—L. C. Dénizart, vol. 1. p, 184, sec. 4. no. 3.

(2) Hericourt, Loix Ecclesiastique, introductron, p. 12 & 13.

(3) Guenois' Chronologie, p. 7.

to the year 1417,(1) the Christian world saw, with astonishment and disgust, two co-existent Popes, each claiming an equal right to the Papal Throne, and supporting their respective pretensions by the full exercise of the papal power, the Gallican Church rejected all foreign authority, and governed herself, principally, by those parts of the Canon Law which had been observed previous to the publication of the new Decretals. In the great Assembly of the Church, which was afterwards held at Constance, in the year 1414,(2) the superiority of the Œcumenick Councils over the Pope was acknowledged and formally declared, and, in consequence of this declaration, and of an agreement which took place between the Council held at Basle in the year 1437, and the Sovereign and States General of France convened at Bourges, in the same year, the Pragmatic Sanction was enacted.(3) But as this Edict materially affected the Papal Jurisdiction, it necessarily created many differences between the Courts of France and Rome, which, becoming subjects of negotiation, were terminated in the year 1516,(4) by the Concordat, a treaty concluded between Francis the First and Pope Leo the Tenth, at Boulogne, and enregistered in the Parliament of Paris, but enregistered in opposition to the opinion of that respectable body, and in their own expression "*du très exprès commandement du Roi, réiteré plusieurs fois.*"(5)

The encroachments of the See of Rome have, in fact, ever been opposed by France,(6) and the liberties of the Gallican Church, in opposition to the exorbitant pretensions of the Holy Pontiff, have, at all times, been asserted, and at all times, supported by the King, the Clergy and the People.(7) These liberties, which comprehend not only the privileges

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(1) Millot's History of France, part 2d. p. 153 & 217.
(2) Dict. Canon. verbo "Constance."
(3) Fleury's Inst. au Droit Canon. cap. 1. vol. 1. p. 20.
(4) Fleury's Instit. au Droit Canon. vol. 1. p. 22.
(5) Hericourt, Loix Ecclesiastique, introduction, p. 9, 10 & 11.
(6) Fleury's Instit. au Droit Canon. vol. 2. p. 220.
(7) Vide the Declaration of the Clergy of France of 1682, and the Royal Edict thereon in Neron, vol. 2. p. 172.

and immunities conceded by the Concordat, but all the ancient Canons adopted by the Gallican Church for its own government, with all its ancient usages, are recognised in the celebrated declaration of the Church of France, made on the 19th of March, 1682, by the Archbishops, Bishops, and Deputies of the Clergy, assembled at Paris, by the King's order, are confirmed by the Royal Edict of the same month, and are founded upon two maxims of very great extent, viz: That the papal and all other ecclesiastical power, is purely spiritual, and does not extend, directly or indirectly, to any thing temporal ;(1) and, that in spiritual concerns, the authority of the Pope being inferior to that of the Councils, he is restrained by the Canons, and cannot, by any new constitution, infringe them, or set aside any usage or custom of the Church of any State, recognised, by the Municipal Law of that State, to be valid(2). The Ecclesiastical Law of France, therefore, at the period above mentioned, although it recognised the Papal Canon Law, comprehended the parts, only, of that system, which had been received by the Gallican Church, under the sanction of the Sovereign, expressed in letters patent, or implied from immemorial usage.—No Papal constitution, decree, decretal, epistle, rescript or bull—no canon or decree of any Council of the Church Œcumenical, national or provincial, had, at that time, or afterwards, in France the effect of Law, until published by the Clergy in their respective Dioceses ; and such publication (even of a constitution relating to an article of faith,) could not be made without the Royal authority and permission.(3) Even the decrees of the Councils of Trent (admitted to have been legally convened,) were not recognised to be Law, their publication

[1] Pothier, 4to. vol. 6. p. 306.

(2) Hericourt, Loix Ecclésiastique, introduction, p. 13, vol. 1. p. 112 —Répert. verbo "Libertés de l'Eglise Gallicane.»—Dictr. de Droit verbo « Libertés de l'Eglise Gallicane»—La Combe, Recueil de Jurisp. Canon. verbo "Libertés de l'Eglise Gallicane.»—Fleury's Inst. au Droit Canon. vol. 2, p. 220 & seq.—Preuves des Libertés de l'Eglise Gallicane, by Pithon.

(3) Hericourt, Loix Ecclesiast. vol. 1. p. 105. col. 2. and vol. 1, p. 98, and col. 1st. and 2d p. 100, col. 1st and p. 105, col. 1. & 2. Dict. Canon. verbo « Canon.» et Droit Canon. La Combe, Recueil de Jurisp. Canon. introd. p. 1 & 2.

cation not having been authorised by the Sovereign; and to give effect to many of its dispositions, which it was thought proper to adopt, they were enacted in the Royal Ordinances.(1)

The Royal Ordinances, with the Law of nature and of nations, and the Ecclesiastical Code, so far as it was sanctioned by the Sovereign, may be considered as the Common or universal Law of France; but the remaining part of the municipal Laws of her several Provinces or Districts were very dissimilar. In the Pays de Droit Ecrit, which were those Provinces in which the Roman Code, by the especial favour of the Sovereign, had been permitted to remain, and was declared to be in force, that system obtained to the exclusion of the Customs;(2) while in the others, and particularly in the Vicomté of Paris, the Customs obtained, to the exclusion of the Roman Law, which, in these Provinces, or Pays de Droit Coûtumier, was of no force, and was considered only as a system of written reason. It was long, indeed, a disputed question in the Jurisdictions of the Vicomté of Paris, whether recourse was not to be had to the Roman, as to a positive Law, for decisions in unforeseen cases for which no remedy was provided by the Custom; but it was ultimately settled that such recourse ought not to be had, and that the Judges were not bound to decide by it.(3)

I feel that I have already trespassed upon your time, yet before I conclude, as the subject upon which I have the honor to address you appears to allow it, I cannot but solicit your attention to the actual state of the Study of the Law in Canada.

The experience of many ages and of many countries seems to have shown, that the elements of science are best inculcated by public lectures—rightly conducted they awaken the attention

(1) Hericourt, Loix Ecclesiastique, vol. 1, p. 99, col. 1 & 2.

(2) Ferrière, D. D. verbo « Pays de Droit Ecrit.»

(3) Ferrière, D. D. verbo "Pays de Droit Ecrit." Dumoulin, des Fiefs introduction, no. 106 & 109. D'Aguesseau, vol. 1. p. 156. L. C. Dénizart, vol. 5, p. 674. Ferrière, gd. Com. vol. 1. p. 18 & 19, no. 1, 2, 3, 4 & seq. Ibid. p. 306, vol. 4. art 10. Dict. de Jurisp. de Prost. de Royer, vol. 1. p. 6. Discours Préliminaire. Le Prestre Cent. 3. cap. 85, p. 675, which cites an Ordinance of Philippe le Bel, declaring France not to be governed by the Civil Law.

attention of the student, abridge his labour, enable him to save time, guide his enquiries, relieve the tediousness of private research, and impress the principles of his pursuit more effectually upon his memory.(1)

The Student of Law in Canada has no assistance of this description; he toils alone in an extensive field of abstruse science which he finds greatly neglected, and therefore too hastily deems to be despised, and, discouraged from the commencement of his labours, he is left to his own exertions, and is compelled to clear and prepare the path of his own instruction, almost without aid of any kind.

Would not an effort to relieve him in this arduous and solitary task, as one among the first fruits of this Society, be highly worthy of its views and character? And is it too much to say, that a public Institution, which would enable those who intend to pursue the profession of the Law to lay the foundation of their studies in a solid scientifical method, and afford them more ample knowledge of the peculiar system of Jurisprudence by which we are governed, would be productive of great and lasting benefit, not merely to the student, but to the public at large?

It is not, however, my intention, upon the present occasion, to press this subject any further. The system to which I have just alluded is one of real merit, it is built upon the soundest foundations of natural and universal Justice, approved by experience, and is most admired by those who know it best. Its claims to notice are therefore so apparent, that I shall indulge myself in the hope, that the influence of this Society will soon be exerted for the establishment of some Institution of a public description, in which the Law may be taught AS A SCIENCE—A science which, though hitherto neglected, is of the first importance to mankind, and "with all its defects, redundancies and errors, is the united "reason of ages—the pride of the human intellect"(2)

(1) Vide Sir James Mackintosh's discourse on the Study of the Law of Nature and of Nations, p. 2.
(2) Burke's Works, 4to. vol. 3. p. 134.

Outlines of the Geology of Lake Superior, by Commander H. W. BAYFIELD, *Royal Navy, Member of the Astronomical Society of London, and Honorary Member of the Literary and Historical Society of Quebec.*

1. LAKE SUPERIOR—Preliminary remarks.—2. Its geographical situation and magnitude.—3. Variation of the compass.—4. Depth and nature of its bottom.—5. Proofs that its waters have been higher.—6. No tides.—Local causes of the partial risings of its waters.—7. Whether its waters are still diminishing or not, uncertain.—8. Elevation of its surface above the sea.—9. Geological situation.—Extent of great chain of older rocks. Its basin and height of the sources of its rivers and of its hills.—10. Division of its rocks into orders.—11. Sienitic granite, its situation and extent.—12. Greenstone, common jasper, slates, and transition limestone.—13. Trap or overlying rocks, amygdaloid, porphyry, trap greenstone. Sketch illustrative of its occasional basaltic nature. Trap sienite, how distinguished from sienitic granite.—14. Old red sandstone, its extent, rests on granite.—How stratified.—Explanatory sketches and remarks.—15. Reasons for naming the sandstone the old red, &c.—16. Traces of greywacke and remarks respecting the Greenstone.—17. Red rock of Neepigon bay.—18. Ile Royal, native copper.—19. Michipicoten island.—20. Caribou island. 21.—Islands of the twelve Apostles.—22. The great promontory or peninsula of Keewawonan.—Situation of a vein of copper ore.—23. Remarks respecting the connexion and relative ages of the rock formations.—Boulders of shell limestone.—24. Alluvial deposits of the lake and its rivers, downs, alluvial deposits of the St. Louis, Raministiqui-a, &c.—25. Synopsis of minerals.—26. Magnetic nature of the trap rocks.—27. Concluding remarks.

1. Lake Superior has been lately visited with a view to geological enquiry by the following gentlemen, with all of whom we have been personally acquainted: Mr. Schoolcraft, American Indian Agent at the Falls of St. Mary, Doctor Bigsby, and Doctor Richardson. The first of these gentlemen has written an account of his tour through the lakes to the head waters of the Mississippi, which contains brief, but faithful, notices of the south shore of Lake Superior. Doctor Bigsby is well known in this country, for the zeal and ability which he has displayed in the investigation of its geological phenomena. Doctor Richardson passed along the north coast of Lakes Huron and Superior in canoes, and arrived with Captain Franklin and his party at Fort William, where we then were, in May 1825. From this latter gentleman something worthy of his pen may be expected, relative to the geology of those parts of the lakes which he had an opportunity of observing; and although the land arctic expedition having a greater object in view, travelled with all possible rapidity, yet his great experience, and the advantage of having afterwards traced the great primitive formations further westward than either of the other gentlemen, will enable him to form a more enlarged idea of the extent and trending of the several formations, as well as their connexion with other rocks.

Each of these gentlemen has travelled with the avowed view of collecting geological facts, and with the intention of communicating those facts to the public. We, on the contrary, were fully occupied, by the engrossing details of a service, (the survey of the lakes,) which allowed of no respite; which required the most incessant exertion both of mind and body; and in which the practical application of several sciences, involving many long and difficult calculations, left us scarcely the necessary time for rest and refreshment. Under these circumstances we could only view the subject of

Geology

Geology as amateurs, and our observations with regard to the great rock formations among which we lived, were viewed with interest, it is true, but also with a degree of regret, that our duties prevented us from devoting to their examination, that degree of research which we believe to be due to the importance of the subject.

From these considerations it at first appeared to us, as it possibly may to others, scarcely short of presumption to attempt to write any thing, concerning the Geology of Lake Superior, and it seems therefore necessary, that we should give our reasons, for attempting that which may otherwise appear a work of supererogation.

In the first place, we believe we are the only person, having any knowledge of geology, however slight ours may be, who has completely circumnavigated Lake Superior, and visited all its bays and islands. This gives us the advantage of considering the geology of the whole lake in one view, and tracing the various formations, from shore to shore.

Of the gentlemen whom I have mentioned, Mr. Schoolcraft has only visited the south coast, and even there he did not circumnavigate the interesting and magnificent promontory of Keewawonan.—Doctor Bigsby has only seen the north coast from St. Mary to the Grand Portage, and Dr. Richardson from St. Mary to Fort William. We have not mentioned the American gentlemen of Major Long's expedition who returned from Fort William to St. Mary, because their geological notices of the coast, from the rapidity with which they travelled, were extremely scanty.

None of these gentlemen has visited either the immense bays, or the distant islands, and even were this not the case, it may easily be imagined, that, in so great an extent of country, geological phenomena may be met with by one which may have escaped the other, particularly when the investigations of all have been more or less cursory.

We trust we have now said enough to explain the motives which induce us to hope that this attempt may be useful; and only wish, that our knowledge of the science of Geology were commensurate with the advantages which we have mentioned, or that those advantages had been enjoyed by either of those gentlemen, who, in that case would have rendered it unnecessary for us to attempt a task to which we feel ourselves but indifferently adequate.

It is not our intention to give a full and minute account of the various rock formations, or of the minerals which they contain. Our endeavours will be confined to giving a concise and general view of them, making such observations as may occur to us, and which may naturally arise out of the subject under consideration. We shall endeavour to avoid all hypothesis, convinced that the science of Geology is not yet sufficiently advanced to admit of the reception of any one theory to the exclusion of the rest.

The objects of Geology are to examine the crust of the globe: to seek among the ruins of strata for the only records of those awful events which have swept whole orders of organized beings from existence. These are only to be obtained by the accumulation of facts. By endeavouring to add to the mass of information now collecting in all parts of the world, we may fairly hope to be useful; and it is this which has stimulated us to this undertaking.

We shall also enumerate such minerals as were met with, and their localities.

2. Lake Superior is the largest and most elevated of those magnificent inland Seas, the Canadian Lakes. It is situated between the meridians of 92°. 14′ and 84° 34′ west longitude from Greenwich, and the parallels of 49° 1′ and 46° 25′ north latitude. Following the sinuosities of its coasts, it is about 1500 geographical miles in circumference. Its length on a curved line through its centre is about 360, and its extreme breadth 140 geographical miles. Its shape will

will be best seen by reference to a map, and will explain the reason for measuring its length in the manner which we have just mentioned.

3. The variation of the magnetic needle varies from 2° 42′ to 12° 8′ east. The dip, as ascertained by Captain Franklin, at Fort William is 77° 58′; the variation near that place is 9° 5′ east. The needle is very much disturbed in many places by the magnetic nature of the oxides of iron which enter into the composition of many of the rocks. The variation encreases gradually from the eastern extremity of the Lake westward, but is greatest near the Grand Portage and Ile Royale.

4. The water of Lake Superior is as pure and clear as any in the world, and is always extremely cold, from its great depth, which varies from 80 to 150 fathoms, but as we could sound in such depths only in very calm weather, not being furnished with the proper sounding machines, and did not sound in the centre, we have reason to think that its greatest depth will not be overrated at 200 fathoms.

The nature of the bottom of this lake was frequently ascertained by us, as portions of it were always found adhering to our anchors and sounding leads. It consisted, for the most part, of a very adhesive clay, containing small shells, of the species at present existing in the lake. When exposed to the air, this clay immediately became indurated in so great a degree as to require a smart blow to break it.—It effervesced slightly with diluted nitric acid, but whether from a mixture of carbonate of lime, or from the presence of finely comminuted shells we could not determine. This clay is of different colours in different parts of the lake. Between Ile Royale and the north shore it is blue in the vicinity of the south coast red, from the red oxide of iron in the sand stone of that coast: whilst near Michipicoten it is white and hardens into a substance resembling pipe clay.

We have mentioned these circumstances because they seem to

to us to throw considerable light upon what is now going on in these great bodies of fresh water. We see that extensive horizontal depositions are still forming which contain the shells of species at present residing in the lake: and that these depositions only require to be exposed to the action of the air, to become horizontal rock formations.

If the hypothesis that the lakes were once salt, (which we think is founded on very probable deductions drawn from the nature of their fish,) be really founded on fact, we may easily imagine a marine formation below that which is at present depositing.

5. There are appearances in different parts of Lake Superior, (as well as in the other lakes,) which lead us to infer that its waters have formerly occupied a much higher level than at present. For in valleys at a considerable distance from the present shores, ridges of rolled stones and shells were met with in parallel curves, rising one above the other like the steps, or rather seats, of an amphitheatre, and exactly similar to that which may be observed of the present beaches in most bays.

These ancient beaches attain the elevation of 40 or 50 feet above the present level. There are also appearances of this nature on the immediate shores of the lake. We shall mention, for instance, one near Cabot's Head, on Lake Huron, where we counted no less than seven ridges of shingle, from the present level upwards. The highest ridge was overgrown with a thick grove of spruce trees. The second downwards had bushes or smaller trees of the same kind. The third only small shrubs and flowers. The fourth lichens and mosses. The rest were bare of vegetation; and it is possible that the spray of the surf may reach the third ridge. These appearances plainly indicate an increase of age in proportion to the elevation of each of the ridges. As we have seen the lakes under all circumstances, during a period of many years, we are entitled to affirm, that no partial rise of water, whether from

from gales of wind, or any other cause, could form the three or four most elevated of these ridges, nor could the ice produce this effect. It has evidently been done long since, as is proved by the trees and shrubs which we have mentioned.

6. There is no regularly periodical rising or falling of the lakes, as has been asserted, whether it be, from the influence of the moon, or any other. They rise and fall regularly, from accidental causes, such as that of a very severe winter without the usual thaws. The springs are then locked up all winter, and the whole accumulated snow remains, until the spring of the year, when the weather becoming suddenly warm dissolves it all at once. Hence it will generally be found, that after a very severe winter, the waters of the lakes will be much higher than at other times.

Heavy gales of wind also rise the waters, in the upper parts of the lakes from which they blow, and also cause currents in various directions. The rise of water however, in any part of the Lakes Superior and Huron, from this or any other cause, never exceeds a few feet. When Doctor Bigsby asserts that autumnal gales will raise the water 20 or 30 feet, at Michipicoten, Gargantua, or Otters Head,* we perceive, that he has been deceived, by the hyperbolical mode of speaking of the fur traders. The same thing was told to us at the first of these places, but upon cross questioning the narrator of this story, we found that he only meant the spray of the surf. But we have been encamped on the shores of this Lake, at all seasons, and have seen some as heavy gales as ever blew there, which rose the water only a few feet.

7. Whether a gradual diminution of the waters of this lake be at present going on is a point upon which no one is at present qualified to give an opinion. For no observations have been made or recorded to ascertain this interesting

* Journal of Science, Literature, and Arts, No. XXXV, page 3, Dr. Bigsby on the Geology and Geography of Lake Superior.

ing fact. Any diminution which may be, must be almost imperceptibly gradual, and it would require constant, accurate, and regularly recorded observations during a great number of years, to render the fact indisputable. The streams which discharge into Lake Superior amount to several hundred in number, and the quantity of water supplied by them, is many times greater than that discharged at the Falls of St. Mary, the only outlet. There is however no reason to imagine, from this circumstance, that the quantity of water increases, for it is absolutely necessary that there should be a supply very far exceeding the discharge, to replace the immense expenditure arising from the evaporation from so extensive a surface.

8. The surface of Lake Superior is about 623 feet above the tide water of the Atlantic Ocean. Of this height, 565 feet, the elevation of Lake Erie, has been ascertained by the United States' Engineers, when leveling for the Great Western Canal of New York. 22 ½ feet have been also measured as the amount of the Fall of St. Mary's Rapids. Of the rest, which is merely estimation, 30 feet have been allowed as the difference of level between Lakes Erie and Huron, and we think that 10 feet are not too much for the whole descent of the River St. Mary's, exclusive of the Falls.

Having now mentioned these preliminary matters, which although not strictly geological, are in some measure connected with that subject, and are besides intrinsically interesting, we proceed to take a rapid and general view of the various rock formations.

9. Lake Superior is situated by the southern side of that great chain of Hills composed principally of rocks of the inferior or submedial orders,* which to the eastward, forms

* It will be perceived that we adopt the arrangement of the Revd. W. D. Conybeare in his Introduction to the Geology of England and Wales.

forms the northern coast of Lake Huron, passes close to the northward of Lake Simcoe, is met with in ascending all the streams tributary to the Rice Lakes, and doubtless crosses the Ottawa River, at some point above Lake Chat. It is met with in ascending all the rivers which enter the St. Lawrence from the north, approaches close to that river at Cape Tourmente below Quebec, whence it continues in a north-easterly direction to the coast of Labrador. A spur from this great chain, there is little doubt, crosses the St. Lawrence at the Thousand Islands. To the north-west, sienitic granite supporting slate always highly inclined, sometimes vertical, and having an east north east direction, has been traced as far as Lake Winnipec. The extent westward and south westward is not so well known. It is however certain, that it forms the table land full of the small lakes in which the Mississippi, St. Lawrence, and the rivers which run into Hudson's Bay have their sources: and it is a singular fact, that these are so nearly on a level, that canoes, in very wet seasons, have passed from one to the other. Either this ridge, or another in connexion with it, curves round the sources of the St. Lawrence,* whence it proceeds eastward, (in a curve to the southward,) to Point Iroquois, which, together with Gros Cap, form the entrance of Lake Superior. These opposite headlands, about 4 miles apart, form the gorge of its geological basin: and here it is that the barrier appears to have given way, and allowed a free passage for its waters to the Atlantic.

These southern highlands separate the rivers which run into Lake Superior, from those which are tributary to the Mississippi and Lake Michigan. The Basin of Lake Superior, we consider to be bounded by the summit level or height of land

* It will be perceived that we speak of the sources of the river St. Louis, as being also those of the St. Lawrence. We consider the St. Lawrence as running through the lakes to the sea, and the St. Louis, St. Mary's, St. Clair, Detroit, and Niagara as merely local names for various parts of the same river.

land on which its rivers have their sources. This is much more extensive than the space at present occupied by its waters.

The summit level is in some parts close to the lake, whilst, in others, it is distant 50 or 70 miles. All that is known, (and it is known imperfectly,) on this subject, may be seen by a reference to the latest maps. The height of the sources of such rivers as have been visited by Mr. Schoolcraft and Doctor Bigsby, has been estimated at from 505 to 614 feet above Lake Superior. The summits of the Hills are much higher, both on the north and south side of the lake; We measured some of them geometrically, and we are certain that the highest are at least 1500 feet above the lake; and consequently upwards of 2100 feet above the sea—an elevation insignificant when compared with other mountain chains, but very striking when compared with the general level of the Canadas.

It must be remembered, that it is not our intention to give a minute account of the rock formations of Lake Superior, for that has been already ably done, by that zealous and indefatigable geologist Doctor Bigsby:

We shall endeavour to give a concise and general view of the several formations, shewing the extent they occupy, and the connexion of one side of the lake with the other by means of the islands, &c. We shall then notice those other parts of the subject which have been left undone by Doctor Bigsby, or which may have escaped his notice.

10. For the sake of perspicuity alone, we shall divide the rocks of this lake into three orders.

First. The inferior order.

In this order we comprise various granites, which almost always contain more or less hornblende, and sometimes hornblende and felspar alone.

In this last state we have seen it of large crystals of both minerals

minerals, and at others in grains very minute, and passing into greenstone.

Neither gneiss nor mica slate was met with; although the granite, by an abundance of mica or a lamellar structure, may for a short space, sometimes assume the appearance of either.

SECOND. The submedial order.

In this order we noticed greenstone, common jasper, a variety of slates as greenstone, flinty chlorite and talcose slates, and, in one place alone, transition limestone. In one instance we think we observed traces of greywacke.

THIRD. Trap or overlying rocks.

These are very abundant. The most so is amygdaloid; various kinds of porphyry are next in quantity; then trap greenstone and sienite, (the former often basaltic,) and pitchstone.

FOURTH. The medial order.

The only rock of this order is the old red sandstone.

We shall now proceed to give a general idea of the relative quantities of these rocks, and of their situation.

11. Of the inferior order, sienitic granite, almost always containing hornblende, (for which reason we adopt the term sienitic granite,) forms the highest hills; and it also either forms the shore, or is immediately in rear of it, from one extremity of the north coast to the other, that is, from Gros Cap to the St. Louis. It also forms the central parts of several of the large islands, such as Michipicoten Island, St. Ignatius Island, &c.

It is also met with on the south coast, where it forms the nucleus of Point Keewawonan, and many hills from in rear of Granite Point to the Huron Islands, which last are also of this rock. The Porcupine or Wisconsan Mountains about 1500 feet above the lake, are also of granite.

12. Submedial order. Greenstone. This is very abundant. It occurs in immense beds, forming perpendicular and

and columnar precipices, frequently 1000, and, at Thunder Cape 1350 feet above the lake. It forms almost the whole of the Pie Island the south side of which is a precipice from 500 to 800 feet high. This precipice displays a beautiful geological section of the island. In some parts stratification is visible half way up the cliffs; but, in general, only near the water. The strata near the water were alone accessible, they were of clay slate dipping to the NE. or nearly so, at an angle of about 10° with the horizon. These strata supported immense masses of greenstone of a pilastered or columnar structure, displaying no signs of stratification.

Greenstone is found associated with the granite from one end of the north coast to the other.

We venture it as our opinion, that this greenstone, which passes into sienite, and thence into sienitic granite, should be classed as we have done, separately from the trap greenstones and sienites, which are associated with the amygdaloids and porphyry, and which in general occupy, excepting in veins, a comparatively lower elevation. The greenstone which we have placed in the submedial order, merely for distinction, and without pretending that such classification is undoubtedly correct, or to decide that which is still matter of dispute with geologists, is found in immense beds, forming chains of precipitous hills, many miles in extent, sometimes alternating with, and sometimes overlying the granite, frequently at an elevation exceeding 1000 feet above the lake. Doctor Bigsby is of opinion that this rock is stratified: and so we think, but so very indistinctly and irregularly, that we will not venture any other opinion, than that its general direction is from northeast to east. Common jasper, coated with reddish iron ochre, flinty greenstone, chloritic, micaceous, and talcose slates, occur in considerable

quantity

quantity in the Slate Islands, so named by us from that circumstance.

These slates are stratified, highly inclined, sometimes vertical, much disturbed and shattered, direction nearly east and west. Transition limestone has been found by Doctor Bigsby only on Thunder Cape, alternating with sandstone.

13. Trap or overlying rocks. These occupy the same extent as those before mentioned, that is, from one extremity of the lake to the other.

The amygdaloid, we have no doubt, rests on the sienitic granite, although, from the nature of the country, we never saw their junction. It passes into greenstone, simply by being divested of its nodules, on the one hand, and into porphyry, on the other. At least the porphyry often contains, besides its crystals of quartz and felspar, imbedded nodules of calcedony, agate, calcspar, &c. We traced the amygdaloid from near the eastern extremity of the lake at Point Mamainse to Gargantua, thence westward to the south side of Michipicoten Island. It is next found on the Slate Islands; and is very abundant, (forming whole islands,) along the south side of Neepigon and Black Bays, whence it continues to Ile Royale, and thence across to Point Keewawonan, where its debris is plentiful. We did not see it there in place, but we have been told that it was seen by Mr. Thompson astronomer of the boundary line commission. It is however certainly not the principal formation of that promontory as Doctor Bigsby has stated, and who has most likely been misled by report, or by seeing specimens from the masses on the beaches.

From Ile Royale amygdaloid appears at intervals along the north coast south westward all the way to the river St. Louis.

Associated with the amygdaloid are various clay porphyties

ries of various colours and degrees of hardness. Some of the hardest are very beautiful, and susceptible of a very fine polish, particularly one from Agate Cove. This is amygdaloidal porphyry and is an instance of these rocks passing into each other. It is bright red, with small crystals of glassy quartz, and here and there large nodules of calcedonic agate, quartz and calcspar.

Porphyry commences first at Gros Cap, the entrance of the lake. It is not plentiful along the east coast northwards to Michipicoten; but we traced it to Michipicoten Island, off the south side of which it forms a chain of small islets, associated with amygdaloid and other trap rocks.

Like the other rocks of its class, it is seldom seen along the coast, between the point last mentioned and the slate islands; but is very plentiful along the southern side of the archipelago of islands off the mouths of Neepigon and Black Bays. It occurs also on the south side of Ile Royale; and occasionally all along the coast to the westward, to the river St. Louis. We never could discover signs of stratification in any of the porphyries.

Trap greenstone is also found along the whole extent assigned to the two last mentioned rocks. It is frequently porphyritic, containing small rhombic crystals of brownish red felspar. It is also occasionnally basaltic both in veins and in masses.

The columns appear not to be easily separated. They are occasionally of five unequal sides, but by far the greater number have only four.

The pitchstone was found in small quantities, and in thin layers in the interstices of the columns.

The following rough sketch of a small Island in the mouth of Neepegon bay,* taken on the spot, will be explanatory. There

* See fig. 1.

There are other islands of the same kind, and near the same part of the lake.

Of the trap rocks, sienite alone remains to be noticed. This is merely a greenstone with a superabundance of felspar. Its highly ferruginous nature, and its intimate connexion with the amygdaloids and porphyries into which it passes, together with the absence of chlorite, distinguish it in our opinion from the sienitic granite; even although the last be destitute of both quartz and mica. Its felspar is never so red as that of the sienitic granite; but is often stained of a dark green colour by the hornblende, and iron rust brown, by the oxide of that metal which it almost always contains. It also strongly affects the compass needle, which the sienitic granite never does. Lastly, it is always found in intimate association with the other trap rocks which we have enumerated. There were certainly appearances of stratification in the amygdaloid, but they were so very indistinct, and we could spare so little time to the examination, that we canhot venture to assert this circumstance as fact.

14. Medial order. The old red sandstone. This extensive deposition forms the falls or rapids of St. Mary. It is again seen at the waters' edge at Gros Cap: thence northward at Bachewine Bay, Ile Parisien, Sandy, Montreal, Lizard and Gravelly Islands, all of which are horizontally stratified, or nearly so. It may be traced, although in small quantities, almost to Michipicoten. Caribou island is formed of it. Between Michipicoten and the east point of Neepigon Bay it was seen only as debris, but along the north side of the islands of that bay, and on its northern and western shores, it appears in high cliffs, and attains an elevation of about 400 feet above the lake. Continuing westward, it is found along the islands of Black Bay. In the centre of that bay it forms several entire islands. We continue to trace

it

it to Thunder Cape. It is also met with on the opposite side of Thunder Bay, and in small quantities to the Grand Portage, and even to the St. Louis.

On the south-west side of Ile Royale it is found plentifully, being there frequently a conglomerate precisely similar to that of the opposite point of Keewawonan, on the south coast.

It forms cliffs alternately with sandy beaches on the south coast from Point Iroquois to the St. Louis. The magnificent cliffs of Les Portailles and of Grand Island, are of this rock, where it attains an elevation equal to that in Neepigon Bay on the north coast. At Les Portailles and Grand Island there are perpendicular cliffs, from 300 to 400 feet above the lake, broken into the most beautiful and picturesque arches,* (some of which a boat can pass under,) porticos, columns, and caverns of immense dimensions. These are formed by the heavy surges of this great lake, which rival those of the Atlantic.

From Granite Point to the east point of the great bay of Keewawonan, it is found resting immediately on granite. It forms horizontally stratified cliffs along the whole of the south east side of the great promontory of Keewawonan. The north side of that promontory for many miles to the westward of its northeast extremity, is of the same formation, either stratified like the southeast side, or more generally as coarse conglomerate, similar to that of Ile Royale and Neepigon Bay. Precipitous points of this rock, with sandy bays, the beaches of which are formed from the disintegration of its particles, continue to the islands of the Twelve Apostles, which are also of sandstone.

From these islands to the St. Louis, the same formation continues, and it is found in cliffs, occasionally, on the north coast

* See Schoolcraft's tour for description of the arched rock.

coast opposite, for at least 20 miles to the north eastward of the entrance of that river. We ascended the St. Louis, about 15 miles in a direct line from its entrance. The first rapids are about 1½ or 2 miles further and are over this rock.

Having now traced the extent of the sandstone from one extremity of the lake to the other, noticed its existence on both shores, and traced it across the lake by many of the islands, so as to leave no doubt of its being a general formation, throughout the whole of the basin of Lake Superior, we next proceed to mention some other particulars concerning it. In the first place, it rests immediately on the granite.* It is in general horizontally stratified, or nearly so, even at its immediate contact with that rock; as in the following sketches† taken on the south coast where there are many peninsulas of granite, joined to the main by isthmuses of sandstone, which are fast yielding to the incessant washing of the lake, so that, at no very distant period, these peninsulas will become islets, like many others near them, and which have become so in the same manner.

There are many other instances of the conjunction of these rocks similar to those above, which serve to prove that the sandstone was deposited after the granite occupied its present position, and that it has not been disturbed since: but our duty is to relate that which may bear on either side of a question: consequently we must say that we think that there are other appearances which directly contradict this inference, such as those represented in the following sketch,‡ and observations,

The sketch was taken on the west side of a bay the next north westward of that in which is Soosoowagaming river,

*Doctor Bigsby saw conglomerate resting upon and alternating with amygdaloid at or near the Point Mamainse north coast Lake Superior.

† See figure 2 and 3.

‡ See figure 4.

On the northwest side of Point Keewawonan the high central part of which we have no doubt is granite, the sandstone is inclined at various angles dipping to the north and northwest. Its inclination was always greatest, when the granite hills were nearest to the coast, amounting in some cases to 70 degrees. On approaching the Porcupine or Wisconsan Mountains,* the same phenomena occurred, and in that part of the coast where those hills are only distant about a mile from the lake the dip to the northward was 70 degrees.

At Montreal River, and at other places on the south coast, the sandstone was also highly inclined, but apparently from subsidence or displacement. Having now mentioned instances in which it appears that the granite has hove up the sandstone after it was deposited, as well as those of a contrary nature, we shall leave it to those who have more leisure and more ability to draw the proper deductions therefrom. Our business, to the best of our ability, is the faithful relation of facts.

The sandstone sometimes appears in undulating strata, as in the following sketch representing the entrance of Horse Shoe Cove, in an island in the mouth of Black Bay on the north coast.‡

Upon examination of the junction of the granite and sandstone in several places on the south coast, we perceived a mutual decomposition for 5 or 6 inches, and the sandstone, for the first foot above the granite was full of scales of its white mica.

There appears to be little doubt that this formation is of immense extent to the west and southwest. It probably reaches to the foot of the Rocky Mountains.§ It is also not improbable, that it is the formation upon which the limestones of lake Huron rest:—For sandstone appears at the Neepish Rapids, and in the bed of the river Minestan,†

*Wisconsan, in the Chippewa language signifies a Porcupine.

‡See Fig. 5.

§See Major Long's expedition and other American Writers.

†Here it supports diluvial calcareous sand clay containing shells similar to those of the lakes, with occasional boulders of granite, &c.

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on the south-east coast of that lake: also at the south point of Sagana bay.

At the Falls of Niagara and below them, it supports fetid limestone similar to some of the limestone of the Manitoulins, also at the Oswego and Genessee rivers on lake Ontario.

In opposition to this supposition, however, it must be remarked, that we have often seen the junction of the limestone of Lake Huron with the granite, gneiss, and quartz rock, and in every instance it laid immediately upon them, without any rock intervening.

We are of opinion that it requires much more elaborate investigation than has yet been bestowed to render it certain that the sandstone of Lake Superior, and that of the extensive tracts of country which we have mentioned are the same formation, for the sandstone of the northern parts of New-York, contain gypsum and rock salt, and would therefore according to the generally received opinions of geologists, belong to a younger order of rocks. On the other hand, great quantities of gypsum are found on the St. Martins Islands near Michilimakinac, in the immediate vicinity of which large slabs of sandstone occur, so little injured, that they must be very near their parent rock.

15. Having made all the observations which appear to us likely to throw any light upon this subject, we proceed to give our reasons for terming the sandstone of Lake Superior the old red. These are, its position immediately on the granite, its structure and component parts. The two last have been fully described by Doctor Bigsby, it will therefore only be necessary to observe, that it is principally composed of fine grains of quartz and small fragments of felspar, containing disintegrated particles of all the older rocks of the lake. When it is so coarse as to become a conglomerate, which very frequently is the case, it contains fragments of the trap or overlying rocks, as well as of the inferior order. It is in some districts

 simply

simply red and white ; in others it is variegated red, white, yellow, grey and dark reddish brown. It is sometimes argillaceous, and often ferruginous. There are often interposed between its strata thin layers of a black ferruginous sandstone not more than half an inch thick, which easily crumbles, and forms a black heavy sand very plentiful on the beaches. It also often contains thin plates of indurated red and green clay. It only sometimes slightly effervesces with acids : and when it is a conglomerate, it coutains much carbonate of lime, both in veins, and in its cement. This is particularly the case on the north side of Point Keewawonan and on the island off its north east extremity.

It is in this sandstone, that the vein of malachite occurs on the east point of Copperas Harbour, about seven miles to the westward of the east end of Point Keewawonan*. We have met with traces of copper ore, in other instances in this sandstone.

We were ever on the look out for organic remains in this rock but never discovered any : nor has Doctor Bigsby. Lieut. Collins however who accompanied us thinks he saw a shell and Mr. Schoolcraft in his tour has recorded that he found another.

In the north western part of the great Neepigon bay, both on the main and islands, we remarked that the sandstone which was superimposed on granite supported immense beds of greenstone, more than a hundred feet thick. In short greenstone laid upon the sand stone in almost every island in this bay.

16. There is a high island near the main, in the east end of Neepigon bay, which has a perpendicular cliff of dark iron

*Doctor Bigsby has been misinformed. He says, that this vein of copper ore is amygdaloid. We have examined the locality, and have specimens which we took from the place, both of the ore and of the rock.

grey

grey coloured rock in strata 10 or 12 feet thick. This rock alternates with thin strata of slate until near the summit, when there succeeds several conformable strata of sandstone. The whole of these strata were parallel, dipping to the south east at an angle of about 20° degrees with the horizon. The whole cliff was about 450 feet above the lake. We have little doubt that this dark rock and the alternating slate belong to the greywacke formation, for we found a large mass of well defined greywacke on a neighbouring island. Lydian stone was found on the same island. It may not be unimportant to remark here, that the greenstone of this lake has, in general, a massive and columnar structure at the summits of the cliffs, and that lower down those cliffs it becomes more or less slaty, in which it sometimes merely shows signs of stratification, in others, as at the Pic Island, it is decidedly so. It then sometimes contains globular concretions not unlike those observed in the greywacke of the St. Lawrence. We certainly feel some hesitation in opposing our opinion to that of Doctor Bigsby who conceives these appearances to arise merely from a change of structure in the greenstone. Nevertheless we are decided in thinking, that, at least in the locality which we have best examined, the Pic island, the greenstone rests on a clay slate which we class in the submedial order.

17. Before quitting the consideration of the sandstone, we must mention a singular rock which has been only slightly noticed by Doctor Bigsby. It occurs in cliffs on the north side of the easternmost Neepigon islands, where it is massive, of a brick red colour, striped and veined with impure white. It is surmounted by a single stratum of a dark grey rock which we could not get at, and which may be limestone. Doctor Bigsby found this rock near Thunder Cape, of a red colour, also massive, and superimposed on alternate strata of red sandstone and limestone destitute of organic remains. This is the only instance of limestone in place hitherto discovered

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on this lake. There is however a large tabular mass, or perhaps a bed of crystalline limestone, (discovered by us,) superimposed upon, or imbedded in the trap greenstone of the slate islands. The red rock above mentioned is also abundant in the western parts of Neepigon bay. It has been supposed that it is stratified, but this we think is a mistake arising from the stripes and veins which we have mentioned. Doctor Bigsby has ventured an opinion, founded principally upon the above supposition, that this is porphyry divested of its crystals, and also that it passes into sandstone.*

The first part of this supposition we think extremely probable; but the last, we think, would require strong and unanswerable reasons to support it, ere it could be received as an undoubted fact, contrary as it is to all former observations on the nature and connexion of those rocks. We have mentioned the colour of this rock. It is of different degrees of hardness in different places; sometimes as hard, or nearly so, as hornstone, when it has a flinty fracture passing into conchoidal. At others it is slightly granular. It also occurs of earthy fracture, and so soft that it can be cut by a knife, in which state it is used by the Indians to make their pipes. It then very much resembles potstone. Upon the whole we are of opinion that the base of this rock is compact felspar, and that it is nearly allied to the porphyries.

Having now noticed the whole of the rock formations of Lake Superior, we shall give a brief description of the large islands, which have, we believe, never been visited with this object, by any excepting ourselves.

18. Ile Royale is about 45 miles long, by 7 or 8 broad, lying in a north east and south west direction. Its centre is composed of ridges of trap sienite parallel to its length, and of greenstone, which last abounds principally on its south side.

*See Doctor Bigsby on the geology and geography of Lake Superior in the periodical work mentioned in a former note.

About

About half-way along its north west side, from the south west towards the north east, parallel chains of long and narrow islets of amygdaloid, containing the usual nodules, together with native copper, commence and continue to its north east extremity. At the distance of about two miles further in the same direction is Passage Island, also of amygdaloid, and containing native copper in veins and cavities associated with prehnite, quartz and calcspar.

In the small bays of these agmydaloidal islets, the debris of veins was found in great quantities. From the rock, which frequently adhered to these tabular masses, it seems that they are from a dark brown porphyritic trap. Native copper in small grains, plates and wires was very plentiful in these masses, and was associated with prehnite, quartz and calcspar. These portions of a vein could not have come from far, as their edges and angles were not in the least worn. It is probable, that they have been washed out of a neighbouring vein by the waves.

It is a very remarkable and interesting fact, that Doctor Richardson found specimens precisely similar to these, near the Polar Sea. He says, "we also found some large tabular "fragments, evidently portions of a vein, consisting of prehn-"ite associated with calcareous spar and native copper."*

This vein, (he also adds,) he supposes to be in feldspathose trap.

On the south east side of Ile Royale, there are similar chains of islets, extending 7 or 8 miles in length, and exactly parallel to the long narrow point of trap sienite which is a continuation of the central ridge of the island, and which, projecting a little beyond these chains of islets to the north eastwards forms the north east point of the island. Porphyry and greenstone are also common among these islets, and here and there the sandstone is visible. Further to the south west this latter rock

* Appendix to Franklin's first journey to the Polar Sea.

rock appears, in a long and low chain of small islets, across a bay: and the south west end of the island is of conglomerate belonging to the same formation, and exactly similar to the shores of Point Keewawonan opposite, where copper is also found. Copper has also been found among the Wisconsan mountains. Either these mountains or those of Point Keewawonan, there is little doubt, are the original site of the great mass of native copper described by Henry, and since by Schoolcraft on the banks of the Ontonagon river.

19. The central parts of Michipicoten island have never been explored; but there are appearances sufficient to justify us in affirming, that granite and greenstone are its principal rocks.

On its south side, like all the rest of the islands of the north coast, amygdaloid, porphyry, and trap greenstone abound; but no sandstone, except in debris, was noticed.

20. Caribou Island, so little known hitherto, is about 6 miles in circumference and of horizontal sandstone, surmounted by sand and boulders of the rocks of the north coast. These last are in immense quantities off its south and south west points, and form a very dangerous shoal for about 3 miles out into the lake.

21. The islands of the Twelve Apostles, as well as the others, have never been examined, excepting by ourselves. They are twenty-three in number, and are all based on the sandstone, which is here highly ferruginous. Over the sandstone is a thick deposit of ferruginous sandy clay, of a dark red colour. It is remarkable that the north-east and south-east sides of all these islands have perpendicular cliffs of sandstone, seldom more than 60 feet high. These were fast decreasing from the action of the waves; whilst on the south-west and north-west sides, the cliffs were of the red sandy clay. There were no beaches, excepting at the south points of these islands, where, in general, there were triangular points of sand,

land, inclosing a small lake or rather pond. The sandstone was not so distinctly stratified as usual. It also appeared sometimes in a state of disintegration and passing into the red clay. The same appearances were observed in the neighbouring bay of Chequamegon, and in the vicinity of Montreal River. This red sandy clay certainly resembles very much the red marle of the new red sandstone formation; but yet we adhere to our former opinion that it is the old red, from its lying immediately upon the granite, being conformably stratified with slate which appears connected with the greywacke and supporting very old limestone.

22. The great promontory of Keewawonan has only been examined, and that slightly, by ourselves. Mr. Schoolcraft passed over the Isthmus of this Peninsula, and did not, therefore, circumnavigate it.

It has been erroneously stated to be a district of amygdaloid; but the gentleman who wrote thus did not visit it, and was therefore obliged to take the report of others. The central parts of this great peninsula are very high, consisting of steep and conical hills, which from the distance that we could see them at, from a vessel in the Lake, we consider to be at least 800, and probably 1000 feet above the lake. Being familiar with the appearance of granite hills, we have no doubt that these are of that rock. All along the south east side of the Peninsula, points of sandstone cliffs and sandy beaches between, continue until within about 7 miles of its north east extremity. Here a large bay runs into the foot of the hills, and the sandstone ceases, the shore being then of the older rocks. The weather did not permit us to land, but we think, that porphyry, greenstone, and amygdaloid will be found here, from the nature of the fragments which compose the beaches, as well as from the appearance of these rocks. The extreme end of Point Keewawonan is of trap greenstone, off which lies an island, which we have named Manitou Island, because it is much dreaded by the Indians, who believe that it is the

habitation of a Manitou or Spirit. This island is of conglomerate. The north-west side of Point Keewawonan is principally of conglomerate, which is in general the lowest stratum of the sandstone formation to which it belongs. Sandstone and conglomerate however, that is fine and coarse sandstone, not unfrequently alternate with each other. Points of trap greenstone are common, and almost all along this side of the point, there are parallel chains of small trap islets close to the shore, very like those of Ile Royale, which is distant about 41 miles to the northward.

Further to the south west, points of sandstone cliffs and sandy bays between, occur as on the south east side.

We never met with amygdaloid in place, on this promontory: we however think it very probable, that it may be found there, for of course we could not land every where. That rock is very plentiful among the debris of the beaches, containing almond shaped nodules, of calcspar encrusted with green earth, also agates, carnelians, and native copper. Small pieces of malachite associated with calcspar, were also met with occasionally; but never very distant from the locality of that mineral, which we are about to describe.

About seven miles westward from the north east extremity of point Keewawonan, on the east point of Copperas Harbour, there is a vein of copper ore (malachite) 5 or 6 feet wide, and in the old red sandstone, which it traverses in a north and south direction nearly. It is rich in ore, and can be perceived running along the bottom of the lake, under water, until the depth hides it from view. To a person in a boat or vessel close in shore, it appears like a large bluish green rock on the beach.

23. Doctor Bigsby has written so fully upon the trap and other veins which traverse the granite and greenstone, that we shall not dwell on the subject. We must however remark, that we have never noticed a vein of trap passing from granite

into

into sandstone. That Gentleman thinks that these trap veins traverse all the rock formations of the lake promiscuously.

There certainly appears an intimate connexion between the various orders of rocks which we have mentioned. We think the immense beds of greenstone which are superimposed upon the sandstone in Neepigon Bay, an instance of this. As for the latter rock resting upon and alternating with amygdaloid, it does so only in one or two instances, and to small extent, and may possibly arise from displacement.

We have already recorded our opinion as to the porphyry passing into sandstone; and we are equally incredulous as to amygdaloid passing into granite. Facts so contrary to the results of former experience and observation, must be clearly and obviously established, before they can meet with general reception.

It has been written that the sandstone is contemporaneous with the amygdaloids and porphyries; and younger, but not much more so, than the granite. The following considerations may possibly throw some light upon this subject. It is acknowledged that the nodules of the coarser kinds of this sandstone are often composed of the trap rocks* as well as of the inferior order. In short there is scarcely a rock in the lake, of which rounded masses may not be found in this formation. Hence it is obvious that those rocks, not only were formed first; but that they have, subsequently to their formation, been shattered by some powerful agent. The fragments are all worn perfectly smooth, and most of them have been completely rounded by attrition. It seems therefore equally probable that they have been subjected to the long continued action of powerful streams of water, before they were deposited in their present horizontal strata.

How

* We have seen this conglomerate, in some places almost entirely composed of porphyries and other trap rocks; not only its nodules but also its cement.

How then can it be reasonably asserted that the sandstone is older than those rocks from whose partial ruin it is derived?

As in no instance, to our knowledge, has a mass of shell limestone been found in this sandstone, it appears tolerably certain that the great convulsion which formed the materials for this extensive deposition took place at a period previous to the formation of the Lake Huron limestones; and this deduction is rendered still more probable from the boulders of shell limestone which are found, among others, on the beaches in various parts of the lake, but principally in the north-eastern parts of it. These, we have every reason to believe, have come from the north-east; for we are in possession of specimens of this limestone, of the same age as that of the Manitoulins' from the vicinity of the height of land between the Michipicoten river and that which enters Hudson's bay at Moose factory. We have also seen large masses of foliated gypsum from the same part of the country.*

It is a fact not generally known, that Captain Parry, R. N. found limestone containing similar petrifactions as orthoceræ, fossil corals, &c. near the north eastern extremity of this continent.† The Boulders of shell limestone which we have mentioned, appear to have been brought to Lake Superior by the same great torrent or rush of water, from the north or north east, which has strewed all the southern shores of the lakes with rolled masses of the older rocks; most of which can be traced to their parent rocks, on the northern coasts; and which must have taken place subsequently to the deposition of the sandstone.

Having thus slightly mentioned that which probably has been, we shall next give a brief account of operations at present going on in the lake—operations arising from local causes

*These were given me by J. Haldane, Esq. late chief Factor Hudson's Bay Company.

† See Capt. Parry's second voyage.

ses and altogether insignificant in their effects when compared with those terrific convulsions to which we have alluded. It will be perceived, that we make no mention of the few diluvial beds which are occasionally met with on Lake Superior. That subject has been noticed by Doctor Bigsby, and to him we refer our reader. That Gentleman has, however, made no mention of those alluvial operations, which have been for ages, and are still, at work. These we are aware, are not extensive; yet this appears to us inferior in interest to no other branch of geological inquiry; for here the cause is still in action. We have therefore certain data from which to draw our deductions, which can never be the case, in regard to phenomena of diluvian, much less of antediluvian origin. We however acknowledge that the circumstantial evidence attending many diluvial depositions, falls little short of positive proof.

24. At the bottom or southern side of that bay, of which Point Iroquois is the east point, sandstone, horizontally stratified, is succeeded by sand and gravel, which runs up to the northward 17 or 18 miles, forming the projecting low headland of White Fish Point. From this point, in a W. by S. direction 45 miles, the coast is composed exclusively of beaches of fine sand and gravel, to the west point of the Grand Sable,* where the horizontal sandstone again makes its appearance, protruding from under the sand. A line drawn from the first point in the bay to the westward of Point Iroquois, to the last—the west point of the Grand Sable—will cut off to the northward a triangular tract of country, which is composed of sandy barrens or downs.

It is probable that the southern parts of this tract may be diluvial, like the Grand Sable, but the northern part, for a considerable distance in rear of the present margin of the lake, is composed of parrallel ridges of sand hills, which have evidently

* For the description of this immense diluvial bank of sand and gravel, see Schoolcraft's tour.

dvidently been formed by the prevailing N. W. winds. Gales of wind heave up the sand far above the usual water mark. At times of comparative tranquillity, the sand becomes soon dried by the sun, and is then easily acted upon by the winds, and carried in great quantities into the interior, as we have often observed. New beaches were in process of formation parallel to, and outside of the present: hence there is a constant accumulation of sand upon this part of the coast; the supply for which arises from the destruction of the sandstone cliffs to the westward, by the incessant action of the waves, which, it has been mentioned, form immense caverns, &c. and which, doubtless, by undermining, frequently bring down thousands of tons of this rock, which being of mechanical formation in thin strata, is easily disintegrated and reduced to sand. The progress of this sand to the eastward is assisted by the set of the waters of the lake towards their outlet, for we observed along this part of the coast, near the shore, a slight current in that direction. No doubt this current is stronger, (we observed it in August,) in the spring of the year. when the several hundreds of rivers to the westward, on this side of the lake, are filled to overflowing with the produce of the winter snows. It is remarkable that their entrances were all directed to the east. A long point of sand extending from their western points, ran to the east across their mouths, leaving an entrance several hundred fathoms down the coast. In the dry season, the smaller streams are completely closed, and the river is then barred with sand. After having been some time shut up, these rivers occasionally form a new outlet through a part of the sandy barrier which had been long formed; disclosing to view vast numbers of trees which had been long buried in the alluvial sand and mud. This last contains the shells of the lake, and not unfrequently the bones of fishes, birds, and small land animals, brought there by the eagles, fish hawks, bears, foxes, &c. which usually bring their prey to such unfrequented spots, for the purpose of devouring it at leisure.

The

The trees were in general in good preservation, and in only one instance, we observed a crack in one of them, filled with dark red oxide of iron and pyrites.

From what has been just related, it is evident that the lake is gradually changing its shape, by the destruction of the cliffs, and the consequent formation of the downs. The lighter argillaceous particles of this disintegrated sandstone, as well as those brought down by the rivers, are carried further out into the lake; for we observed that when the depth exceeded 7 fathoms, the bottom was generally of mud or soft clay.

The head, or S. W. end of Lake Superior, is formed by a ridge of sand hills, slightly curved to the westward, which extends across the lake about 9 miles from the sandstone on the south to the older rocks of the north coast. About 15 miles to the S.W. these rocks close; leaving only a passage for the river St. Louis, which there falls over sandstone, as we were informed by the gentlemen of the American Fur Company, who reside near the rapids. The sandy ridge which we have mentioned, may be considered as the base of a triangle, the apex of which is the rapid, and the sides, the ridges of sandstone, and of the older rocks on the north and south. Through this triangular space or valley, the St. Louis winds among alluvial islands of its own formation.

These islands do not continue to the ridge of sand hills forming the head of the lake, for, besides this outer ridge, there is another parallel to it, about a mile further to the S. W. cutting off a section of the triangle, and forming a small lake or large pond, with about 9 feet of water.

The southern part of this pond is filled with reeds and rushes, through which another considerable river flows from the southward, having a common outlet with the St. Louis. The outlet of the St. Louis through the inner, is not opposite to that through the outer ridge; but there are evident marks of a former outlet in the latter, which was nearly so.

The

The following rough eye sketch, from memory, will probably serve to make us understood, and explain the nature of the constantly increasing alluvial deposits of the St. Louis. *See Fig.*

This sketch is merely explanatory; it is not pretended that the number or shapes of the islands are correct.

At Mauvaise Rivière, near the islands of the Twelve Apostles, the Michipicoten River, and the Kamanistiqui-â, the alluvial depositions are extensive; and of course constantly encroaching on the lake. The last, (on the north bank of which is Fort William,) has formed two Deltas, through which it enters the lake by three mouths. In excavating a few feet through the sand, we always came to clay, similar to that deposited immediately without the bar of sand. In this clay, clam and other fresh water shells were abundant; and in the superstratum of sand, small angular fragments of the flinty slate which is found in place at the rapids of the river above. These last have been brought down and deposited by the stream.

The river has evidently elevated its bed; for on either side, its immediate banks are not only much higher than the land a little back; but this last is, in many parts, lower than the level of the river when the waters are high.

It appears that the lighter argillaceous matter is carried out by the stream, and deposited without the bar; and that the sand which is continually coming down also, is thrown out further and further, covering this clay by degrees as it is deposited—an operation which meets with little interruption, from without, as the place is well sheltered from the prevailing winds.

As the nature of these alluvial depositions has, we trust, been explained by the instances which we have related; and as this paper has extended to a much greater length than we at first anticipated, we shall pass over the other rivers, and proceed to give a synopsis of the minerals which we observe in the various orders of rocks. 25.

25. In classing the minerals which we noticed on Lake Superior, we shall follow the system of Professor Jameson, third edition, published in 1820. He has divided minerals into three classes: earthy, saline, and metalliferous. All the minerals hitherto observed on Lake Superior are referable to the first and third classes. As it is not our intention to describe these minerals, we shall confine ourselves to noticing their geological and geographical situation, with such occasional remarks as may be thought of interest.

CLASS FIRST.—EARTHY MINERALS.

GEOLOGICAL AND GEOGRAPHICAL SITUATION.

ORDER I. *Gem.—Genus 10th, Garnet.*

COMMON GARNET.	Is found disseminated in very small crystals in sienitic granite, near east point of Neepigon Bay, L. S. Also, in mica slate and hornblende rock, north coast, Lake Huron. The latter occurs on the Ile aux Outardes 5 or 6 miles east of the French River.

Genus 13th, Quartz.—1st Species Rhomboidal Quartz.

COMMON AMETHYST.	Is found in veins in Thunder Bay, associated with black and brown crystals of quartz. Also in agate balls and cavities in amygdaloid wherever that rock is found.
ROCK CRYSTAL.	Occurs in drusy cavities in amygdaloid of the North coast, &c.
ROSE QUARTZ.	In veins and druses in amygdaloid.
MILKY QUARTZ.	Do. do. do.
FIBROUS QUARTZ.	In nodules do.
COMMON QUARTZ.	Occurs as a component part of the granite, sandstone, &c. in imbedded crystals, in porphyry, and in veins in the granite, greenstone, and amygdaloid.
FLINTY SLATE AND LYDIAN STONE.	The first is found in clay slate, Falls of Kakabika, Kaministiqui-a River. Also in fragments in the alluvium near Fort William. Lastly associated with other slates in the slate islands. The second occurs in thin strata, alternating with slate, supposed to belong to the greywacké formation, Wedge Island Neepigon Bay, &c.

FLINT.—GREY, GREEN, WHITE, AND RED. { In agates, veins, layers, and masses in amygdaloid, and amygdaloidal porphyry, Islands of Neepigon Bay, &c.

CALCEDONY AND CARNELION, YELLOWISH, WHITE, AND RED. { In agates, in amygdaloid. It frequently forms the outer coat or layer of agate balls, having amethyst or quartz in the center. Calcedonic incrustations are frequent in drusy cavities.

JASPER.—Striped red and white, at Agate Cove. It also occurs in agate balls in amygdaloid; in rolled nodules in old red sandstone conglomerate; in boulders of the jasper pudding-stone which appear to have come from the Neepish rapids, river St. Mary; in the quartz rock of La Cloche, lake Huron. This beautiful puddingstone is very abundant, and contains, besides red, brown, and striped jasper, fragments of calcedony, carnelion, &c. in a white quartzose cement.

A coarse common jasper also occurs in the slate islands smeared with iron ochre, and in veins in trap rocks.

Second Species.—Indivisible Quartz.

PITCHSTONE.—Found in thin layers, and in very small quantity, in the interstices round the ends of the columns of basaltic Trap-Islet, in the mouth of Neepigon Bay.

ORDER II.—*Spar.—Genus 1st.—Prehnite.*

FIBROUS PREHNITE.—Abundant on the beaches of Ile Royale, associated with native copper, calcspar, &c. These minerals are found in the tabular fragments of a vein in trap porphyry. It also occurs, according to Doctor Bigsby, in druses in amygdaloid, with rock crystal and calcedony near the Point Mamainse.

Genus 3d.—Zeolite, 6th & 7th Species.

MESOTYPE AND STILBITE.—In nodules and vesicular cavities, usually associated with calcspar and quartz, in

in amygdaloid, wherever that rock is found. The finest specimens were taken from Gargantua, and the south side of Michipicoten Island.

ORDER II.—*Spar.*—*Genus 5th.*

FELSPAR.—Besides forming a component part of sienitic granite, and of the trap rocks, felspar is present in grains in the sandstone. It also occurs in veins in the former rock, and imbedded crystals, (red, white iron rust brown, & glassy,) in clay, porphyry, and greenstone. In trap sienite, the greenstone and oxide of iron colour the felspar muddy green, or dark reddish brown.

Compact felspar is, in all probability, the principal ingredient in the base of the porphyries.

CLAY FAMILY.

CLAY STONE.—Near the entrance of Neepigon river. It is probably connected with the clay porphyries. It is dark red, or brick red, opaque, and just sufficiently soft to be cut with the knife. The Indians make their pipes of it; and, in their possession, we have seen grey varieties, the locality of which we could not ascertain.

INDURATED CLAY, OR LITHOMARGE.

GREEN AND RED.—Is found in thin layers, in the old red sandstone of Ile St. Ignace, mouth of Neepigon Bay.

Genus 8th.

HORNBLENDE.—Besides forming a component part of sienitic granite, &c. was met with in large black crystals, in sienitic granite near Peninsula Harbour, North Coast, Lake Superior.

ORDER II.—*Spar.*—*Genus 8th.*

EPIDOTE.—Occurs in minute crystals in druses and fissures in porphyry of Gros Cap, (Bigsby.) Also in

 veins,

veins, and disseminated in sienitic granite, associated with purple fluor spar, in Peak Island Bay, and near the Black River. Doctor Bigsby also found epidote in a quartz vein in granite, associated with fluor spar, and, we believe, in many other instances.

ORDER III.—*Mica.*

COMMON MICA.—Occurs, black, white, and brown, as a component part of granite; also in veins. A few scales of mica are also visible, occasionally, in the old sandstone.

CHLORITE.—Occurs disseminated in granite and greenstone. chlorite earth occurs also in veins in greenstone in the bay next westward of the Peak Island, where it is associated with calcspar.

This mineral was also found in veins in granite, associated with quartz, felspar, and mica. chlorite slate, associated with other slates on the south coast of the Slate Islands.

GREEN EARTH.—It is very plentiful in amygdaloid, in nodules and vesicular cavities, generally associated with calcspar. It very frequently coats the agate balls. It is also disseminated through amygdaloid. It is also plentiful in, and colours the sandstone occasionally, when in the vicinity of the other rocks.

ORDER IV.

MALACHITE.—This mineral occurs in a vein about 5 or 6 feet wide, in the old red sandstone, on the east point of Copperas Harbour, about 7 miles westward of the eastern extremity of point Keewawonan.

The direction of the vein is nearly north and south, (we did not however take the bearing,) and it is rich in ore. Compact blueish green malachite

malachite was the most plentiful, but brown copper and earthy blue copper were also noticed. It was met with in fragments on the beaches of point Keewawonan, often associated with calcspar. Doctor Bigsby found malachite in boulders of sienite, on the north coast. These must in all probability be derived from the northern hills.

As Mr. Thompson gave Doctor Bigsby a specimen of malachite, in which the ore was interspersed in thick coatings and plates, through a dark hornblende trap, it seems probable that there is more than one locality of this mineral on point Keewawonan, probably not far apart.

ORDER VI.—*Baryte.—Straight Lamellar.*

SULPHATE OF BARYTES.—Was found in a vein in greenstone, Fluor island—off western entrance to Neepigon bay. It was associated with fluor and calcareous spars.

ORDER VII.—*Haloide.—Genus 1st Limestone.*

RHOMB SPAR.—Found in a small vein in the chlorite slate of the slate islands.

CALCSPAR.

REDDISH, GREENISH AND GREYISH WHITE.—Occurs in veins in sienitic granite and greenstone, associated with quartz, felspar, chlorite, &c. In masses in porphyry and vesicular cavities and veins in amygdaloid. In the last rock it often forms whole balls coated with green earth, less frequently with zeolite, sometimes with quartz. It occurs also in the cement of the conglomerate of the old red sandstone, and sometimes traversing it in veins.

SATIN SPAR.—In veins in amygdaloid (Bigsby.)

Genus

Genus 3d Fluor.

OCTAHEDRAL FLUOR FOLIATED & CRYSTALLIZED. } Green fluor spar occurs in a vein in greenstone associated with sulphate of barytes and calcspar. Green and blue fluor occurs with calcspar and red oxide of iron in another vein in the same greenstone, about 3 inches wide, the sides of which were thickly coated with the red oxide of iron. Another vein in company appeared filled almost alone with this ochreous iron ore. The veins are on the south side of fluor island—western entrance Neepigon bay.

Purple fluor associated with pyrites and calcspar, in islands close to Wedge island, east part of Neepigon bay—Also disseminated in sienitic granite Pic island bay.

At Hawk Islet, and near Gargantua in amygdaloid, associated at the latter place with much ferruginous matter, green earth, and calcspar, (Bigsby.) Near Black river it was associated with epidote, in a quartz vein, in granite. (Bigsby.)

Traces of fluor spar were observed in various other parts of the north coast, or in the old red sandstone.

CLASS THIRD.—METALLIFEROUS MINERALS.

NATIVE COPPER.—The most remarkable locality of native copper is the Ontonagon river, on the south coast, which river has its source among the Wisconsin mountains. There is an immense mass of it lying under a high bank, 30 or 40 miles up from the river's

river's mouth. (Schoolcraft.) We also found it on Ile Royale, in considerable quantities, disseminated through tabular masses on the beaches, (which have been noticed in describing Ile Royale,) in membranes, plates, and wires, associated with prehnite, quartz, and calcspar. It also occurred in Ile Royale, and its islets, in veins, and nests in amygdaloid. In one instance a wire of copper passed through the centre of a fortification agate. This agate was split in extracting it, but the copper wire held the parts together.

Small masses of native copper are found occasionally on the beaches of Point Keewawonan. (Schoolcraft.)

NOTE.—Copper pyrites, green carbonate of copper, and plumbago, were found in the amygdaloid of Point Mamainse. (Bigsby.)

Copper pyrites incrusting the sides of an empty vein in greenstone, near Michipicoten. (Bigsby.)

CLASS THIRD.—METALLIFEROUS MINERALS.

OCHRY RED.—IRON ORE.—Iron ore was the only metalliferous mineral found besides copper. It occurs in veins in greenstone fluor island, where it coats the veins which contain fluor spar. In amygdaloid it often coats the agates and other nodules. In the sandstone it is very plentiful, being probably derived from the disintegrated trap rocks. In the conglomerate of the old sandstone it frequently coats the imbedded fragments.

BROWN IRON ORE.—(crystallized and otherwise.)—Was met with on the Islets of Gargantua.

PLUMBAGO.

PLUMBAGO.—In amygdaloid, Point Mamainse. (Bigsby.)

CLAY IRON STONE.—In a vein ¼ an inch thick in amygdaloid, Point Mamainse. (Bigsby.)

IRON PYRITES.—Was found in various parts of the north coast. Disseminated in cubic crystals through greenstone slate—slate islands; in granite—Neepigon Bay. Lastly, in very considerable quantities, both massive and crystallized, in slate subordinate to the old red sandstone, on an islet between Wedge Island and the main land—eastern part of Neepigon Bay. At this place it was also found in veins traversing the black slate in the most beautiful manner in all directions, and having imbedded crystals of quartz, fluor, and calcspar.

26. Iron is a very abundant material in the trap rocks of Lake Superior, rendering them more or less magnetic. They always disturb the magnetic needle, and, in many places, so strongly as to change the variation two points. In one place, the eastern entrance of Black Bay, this local attraction was so great as to render the compasses useless, the North remaining in any direction or point of the horizon to which it might happen to be placed. Whenever the theodolite was set upon a granite or sandstone point, the needle remained undisturbed. On a trap point it was always the contrary. When we were running lines in the boats from a granite headland to one of trap rocks, we could frequently plainly observe the direction indicated by the compass on the boat's table to change, in some cases, a point or two as we approached the latter, and resume its former correct direction as we returned, or as we proceeded out into the lake, without the sphere of its influence.

27. We have now noticed all the genera of minerals which were met with on Lake Superior, and, in some instances, the species also. We have not divided them into sub-species, for that would have been equivalent to a description. It will be seen that they are very numerous; their localities are, however, new and therefore valuable.

Simplicity seems to be characteristic of this lake, particularly in regard to its geology. The formations are few in number, but on a scale of grandeur not frequently met with. Its geological features may be thus summed up. An irregularly oval basin is formed by the inferior order of rocks, having a broken belt or range of trap or overlying rocks on the inner declivity of its northern margin; and probably on its southern margin also, as these trap rocks were observed on the south coast, whenever the granite approached the lake. Lastly, an immense deposition of sandstone, formed from the ruin of parts of the foregoing rocks, extends from side to side, and end to end, of the lake; attaining the same elevation, and resting on granite on either side, containing the same component minerals and imbedded substances. The granites of the north and south coasts are also similar. Both contain hornblende in large quantity, and are traversed by veins of the same nature. These veins pass frequently from granite into greenstone, unaltered either in their nature or direction. This circumstance is one of the reasons which has induced us to class the last named rock in the submedial order, instead of considering it as a trap or overlying rock. Its passage into sienitic granite, and its generally more crystalline nature, as compared with the basalt-like trap greenstone and veins, are others. We think we are correct in this classification, but even if it should appear that we have made a distinction where none exists, it can do no harm. It cannot mislead, for the facts are stated, and consequently any one may draw from them his own conclusions. It is worthy of

 remark

remark that calcspar is abundant in all the orders of rocks. That copper, native or in ore, was also found in all, and fluor spar in all but the sandstone. The various slates of the submedial order, were only found on the slate islands, and on Wedge Island and islets near it, in Neepigon bay; unless the slate which we sometimes observed under the greenstone as at the Pie island, be added. Hence, almost all the formations which usually intervene between the granite and the old red sandstone are wanting, excepting greenstone, and perhaps the limestone discovered by Doctor Bigsby at Thunder Cape, which, as it alternates with the sandstone, is probably transition limestone.

The numerous horizontal depositions above the old red sandstone are entirely wanting; traces of mountain limestone having alone been observed.

With respect to the relative ages of the granite and trap or overlying rocks, it would be mere hypothesis to give an opinion, when it is remembered that the origin of these rocks, whether igneous or aqueous, is still matter of dispute with geologists.

But we are decided in our opinion that the sandstone is of posterior formation to all the rest, from the reasons which we have before given.

It appears to us, that at some period, previous to the deposition of the shell limestones, a great catastrophe, the nature of which it would be vain to surmise, has shattered the granitic and trap formations. That their fragments were then long subjected to the action of rapid streams of water. A period of quiet seems then to have occurred, in which the sandstone was horizontally deposited. Since its deposition, it appears to have been only partially disturbed in the vicinity of the granite, &c. either by the upheaving in places of that rock or by subsidences.

Finally,

Finally, at a period subsequent to the deposition of the shell limestones, another great convulsion appears to have occurred, probably of diluvial origin, one effect of which appears to have been a rushing current of water from the north east. Such a current has, almost certainly, passed over the face of the country; strewing the south-west sides of the lakes, and the whole country to the south west, with diluvium, and boulders of the rocks now in *situ* on their northern borders.

The same great agent appears to have brought the boulders of old shell limestone from the vicinity of Hudson's bay, to have carried the agates of the lake Superior amygdaloid far to the south west, and the native copper from the vicinity of that lake down the valley of the Mississippi.

We have now completed our endeavours to give an outline of the geology of lake Superior. The task which we have assigned to ourselves has been executed, we are fully conscious, with a degree of ability very far short of our inclination to forward or our admiration of the science to which the subject we have treated belongs. Yet, there is this consolation and hope left to us.—It is, that his efforts can scarcely be entirely useless, who adds but one grain to the heap of information, where the object to be attained is so noble, and so perfectly worthy of the best efforts of the human mind.

Art. II.—*Memoranda respecting colouring materials produced in Canada. By William Green, Esq.*

This country produces various substances fit for the use of artists as pigments.

In the parish of l'Ancienne Lorette and in that of St. Augustin near Quebec, there exists in alluvial soil at the depth of three feet a horizontal stratum of fine yellow clay.

This earth has a very deep and rich hue, and with white in various proportions it gives all the tints which the best yellow ochres afford. Burnt, it gives a light red resembling that formed by burning yellow ochre, but inclining more to orange.

It is an opaque colour, and mixes well with oil or with water; and in oil it dries well.

The Magdalen Islands, in the gulf of St. Lawrence produce a red earth which is brought to Quebec in lumps. In these are interspersed minute portions of some white substance, which seems of the same consistence as the red earth.

The texture of this earth is extremely fine, and the quantity of foreign gritty matter deposited on washing it in water inconsiderable. It nearly resembles Indian red. I do not perceive any inferiority, or any other difference than this—that the Canadian earth, in its natural state, is rather the paler of the two, with more of the hue of red lake—yet it is a very deep red, quite as deep as can be required for any purpose in painting. Burnt, it becomes more bright. With white the tints are all beautiful. Those formed from the raw material partake of the hue of red lake, and those made with burnt earth seem tinged with vermillion. This substance, both in its natural and in its prepared state, might be worthy the attention of artists, being quite as beautiful, and probably as useful, as Indian red. In price there is great disparity, the red earth being sold at Quebec for three pence a pound, which is only half the price of common red ochre, (burnt sulphate of iron), and the price of Indian red being in London above two shillings an ounce. Yet all the red ochres, whether native or artificial, which are used in the arts, are, with the single exception of Indian red, inferior to this earth.

The red earth is somewhat transparent, but by no means sufficiently so to be removed from the class of opaque colours. It mixes with oil, and with water, and in oil it dries readily.

At St. Paul's Bay, on the north shore of the St. Lawrence, 60 miles N. N. E. of Quebec, an earth is washed down from the

the mountains which is of less weight than most other earths. In its dry state, it is of a rich cinnamon colour. In oil it is transparent, and of a tint intermediate between those of raw and of burnt umber. Made red hot and extinguished in water, a sulphureous odour is given out, and the burnt matter well washed and dried, inclines rather more towards red than before, but loses its transparency. In this state, it would probably have no peculiar utility. The transparent tint it affords with oil in its raw state might be very useful, unless the sulpher it appears to contain should impair its properties. This, however, may not be the case; as vermillion, which is a sulphuret (of mercury) is durable, whether combined with other colours in oil or not. As a colour for glazing, this circumstance might form a slighter objection than it might do, were the substance used in combination with white or other colours—indeed it appears best adapted for glazing, as there is no peculiar beauty in the tints it forms with opaque colours.

Many of the spontaneous vegetable productions of this country are capable of affording brilliant and durable colours to the painter and the dyer. The Indians extract from the root of a wild plant which bears some resemblance to madder, a very bright and permanent red dye, with which they tinge their porcupine quills, elk hair and other substances. A red lake has been extracted from it by boiling it in a saturated solution of alum in water, (after having separated a quantity of brown colouring matter by washing the root in cold water, in which the brown, but not the red, matter is soluble; and precipitating the red substance from the aluminous solution by means of an alkali. The volatile alkali is the best. The hue of this lake, when used in oil, is equal in beauty, but not in intensity, to that of the finest carmine, and resists the action of light much longer. Patches of various specimens of carmine and red lake from cochineal were painted in oil on a window pane, which all faded, more or less, and some nearly disappeared on being exposed to strong light for two weeks;—whereas patches of red lake from the Indian plant

plant still remain unchanged, after exposure in a similar situation during two years. This plant is called by the Hurons *Tsavooyan*. It is found of superior quality in the interior. The Hurons derive their supply from Caughnawaugha, although their woods at Lorette produce it. Its root, when dry, is scarcely thicker than a coarse thread, and runs horizontally through the loose soil formed in the woods by the decay of fallen leaves. Its stalk is four sided, furnished with short retroverted hairs, and is surrounded at intervals by small oval leaflets forming a star. The stalk, from its length and weakness, becomes procumbent. It is a *galium*. On extraction from the soil, the root is frequently quite colourless and transparent, resembling undyed silk; but in a few minutes after extraction it acquires its dark hue, and the property of yielding its brown and its red colours. Another plant grows in similar situations, which has the same name of *Tsavooyan*, but which does not resemble madder. The roots, and the roots only, of both *Tsanooyans*, have some external resemblance, but differ in many respects. The latter is bright yellow, the former deep brown. The latter is not used in dying, but is valued as affording an agreeable bitter, and as having the property, when chewed, of curing some kinds of sore mouth.

The Indians dye a very bright and durable yellow, with the seeds of a shrub common on the banks of rivers and lakes. The leaves are fragrant, the seeds very aromatic, and the plant has the aspect of a dwarf willow. It is probably *myrica gale*. The Hurons call it *Ootsigooara Osooqua*, which signifies yellow dye stuff.

A very rich and durable brown for dying, and a lake of the same colour for painting, are afforded by the outer husk of the butternut. (*Juglans cathartica.*) The colour is copiously extracted by infusion in warm water, and may be precipitated either by alum or muriate of tin—and if by the latter, it will dry the quicker in oil. It is of a tint intermediate between those of asphaltum and prussiate of copper.

The

The foregoing paper was, upon the motion of His Excellency the Earl of Dalhousie, ordered to be communicated to the Society of arts, manufactures and commerce of London, with specimens of the raw and of the prepared materials, and that society was pleased to award to the writer the gold Isis medal which was received and presented to him by His Excellency at a meeting of the society.

Art. III.—*An account of some meteorological phenomena observed in Canada by Capt. Bonnycastle, R. E. in the years* 1826–7.

At Kingston, in Upper-Canada, for many days previous to Tuesday, August 28th, 1827, the heavens had exhibited the Aurora very brilliantly, and more frequently than had been hitherto observed. On that night the scene was very grand, and I inclose a description of it from the Kingston Herald. I did not witness this splendid scene, neither did I observe that of Saturday night, the 8th of September, which was nearly equal in magnificence. I saw it, however, now and then on other nights, and on Sunday night, the 9th inst. I observed a most uncommon and interesting spectacle which did not appear to me to belong to the usual signs of the Aurora. That night, at about dark or eight o'clock, I saw an arch forming in the sky which, as the obscurity of the night increased, became very luminous. It extended at first from about under Arcturus or the Lion to the Pleiades, with but a small convexity or elevation.

Gradually and exceedingly slow it rose or became more convex, and at nine it attained, on its north-western limb, the altitude of the highest part of the body of Ursa Major, while it had increased in thickness very much, and being complete, formed a broad and highly magnificent arch of pale white light, which spanned a third part of the horizon.

It

It was now like a heavenly bow of luminous white vapour, through which the larger stars of the constellations were very visible; nor did its grandeur or its light diminish when the moon, slowly emerging from the extremity of its south-eastern limb at a ¼ before nine, shewed a deep yellow disk through its splendid veil. At half-past eight the true Aurora became suddenly apparent: first, in the zenith a cloud of bright white light, with a singular curved pear shaped form, arose, and elongating its lesser extremity, slowly bent to the horizon, and as slowly vanished. Then on the south-east arose from the lower boundary of the sky, a rod of the same white light which, enlarging its dimensions very slowly, pointed to and at length reached the milky way at the northern cross, and after shooting through the galaxy with a stately and somewhat stealing pace, slowly vanished.

Even in these appearances there was little or no signs of the Aurora Borealis as it is usually observed in high latitudes. I have seen it in the northern hemisphere sufficiently high to observe the sun at midnight, but I never remember any thing like these slow and stately movements, nor any thing that could be compared with the stationary arch I have described, which, as the moon rose above it, did not disappear even as late as ½ past ten, although the brilliancy of her light had certainly rendered that of the bow very faint.

The thermometer at noon in the shade, for the preceding week, varied from 70 to 84 of Fahrenheit. There had been very little or no rain for a long period, but the night dews had been very heavy, and there was a sudden and very transient thunder storm, which destroyed a barn near this place on the Thursday afternoon.

The greatest extent of the circle I observed was 160 degrees or more than 1-3d of the visible horizon. You may conceive the singularity of the scene when you reflect that the vast expanse of tranquil water of Lake Ontario, the deep gloom of the forest, the town of Kingston, and the immense

ships

ships in the dock yard were all component parts of it. Abstracted by such a scene from all the petty feelings of our nature, which habit and circumstances cause to be generally uppermost, the mind of the contemplative man soars away into the realms of boundless space, forgets for a while the clog that holds it here, and with a full certainty of its own comparative insignificance amid the works of creation, returns humbly to a consciousness of its present state, having added one more to the endless reasons which cause it to adore the inscrutable wisdom of the Almighty Architect of the Universe.

On the 7th September, last year, (1826,) whilst coming up from the gulf, the weather had been cold without much wind, the little there was being from the south west. At two o'clock A. M. in the night, the mate, whose watch it was on deck, suddenly aroused the captain in great alarm, from an unusual appearance on the lee bow. The night was starlight, but suddenly the sky became overcast over the high land of Cornwallis county, and a rapid instantaneous and immensely brilliant light, resembling the Aurora Borealis, shot out of the hitherto gloomy and dark sea on the lee bow, and was so vivid that it lighted every thing distinctly even to the mast head. The mate having alarmed the master, put the helm down, took in sail and called all hands up.

The captain then called me up, but the light which had been only from one quarter, now as suddenly spread over the whole of the sea between the two shores, and the waves before tranquil now became much agitated. I shall never forget the scene which presented itself when I came on deck. The whole sea as far it could be distinguished, was one blazing sheet of awful and most brilliant light such as I never before saw, although I have frequently observed the luminous appearance which the ocean occasionally presents. A long and vivid line of light, superior in brightness to the parts of the sea not immediately near the vessel, showed us the base of the high frowning and dark land abreast of us;

the sky became lowering and intensely obscure, and perhaps such a scene will seldom fall to the lot of many to observe. The oldest sailors on board had never seen any thing of the kind to compare with it, except the captain who had, he said, observed something of the kind in the Trades.

The fish appeared terribly alarmed, long tortuous lines of darting light in a contrary direction to the sea, shewed immense numbers of very large fish flying about as if lost.

The wind increased a little, but not much, and had a peculiar hollow sound. Day broke very slowly, and the sun rose of a fiery and threatening aspect. Rain followed next.

To sail on a sea of fire is the only similitude I can fancy to this really grand and awful scene.

The sprit sail yard and mizen boom were lighted by the reflection as though they had gas lights burning immediately under them, and until just before day break at 4 o'clock, I could distinctly see, by the light of the sea, on any part of the deck, the most minute objects on my watch.

This light first came from the N. W., and there had been a slight Aurora observed about eleven.

I caused a bucket of this fiery water to be drawn up, it was one mass of light when stirred by the hand, and not in sparkles, as usual, but in actual corruscations.

I kept some in an open jug and sealed up some in a bottle. The first night after there was no light on shaking the bottle, but plenty in the jug. The second night the same; the water in the jug sparkled as much as ever. The third night the same: the scintillations were this night visible somewhat strongly on the sea, as even on spitting into the water they appeared, and the usual trick of throwing a rope over and towing it along, caused a very beautiful line of light. On this evening the sun had set very singularly so as to exhibit a double sun, and when a few degrees above the horizon, it showed as if the globe of that luminary had been suddenly changed into a long cylinder which reached the horizon. I made a drawing of it. This night the sea was again very luminous and smooth,

smooth, in fact it was very nearly as much so as before; the water in the jug still the same. On the fourth night the water in the jug was still very brilliant, although oil had been accidentally spilt into it. The fifth night the sea scarcely exhibited any traces of luminosity; the water in the jug this night as brilliant as ever. Sixth and seventh nights, water in the jug the same. I am sorry to say I left the sealed bottle on board in my hurry, and that the water in the jug was spilt before we landed at Quebec.

Sea water being a compound of muriate of soda and sulphate of magnesia, with oxygen and hydrogen, it strikes me that by some combination, a greater or a lesser quantity of a phosphate is formed, or phosphoric acid, in certain cases, which readily melting from its solid state, spreads and diffuses itself over a vast surface, and thus by its greater or lesser volume creates more or less of the phenomena alluded to.

My *data* for this argument, amongst other things, are the two following.

By the strictest investigation, I could discover no appearance whatever, on the occasion above detailed, for supposing that animalculæ had any thing to do with the appearance, and I think the putrescent matter from shoals of dead fish is equally unlikely in sea water.

Secondly, if four drachms of the substance of fresh herring be mixed with two drachms of sulphate of magnesia in two ounces of water, and the whole put in a phial, and allowed to stand 24 hours, on the next night a very beautiful luminous appearance will be seen on shaking the bottle, and this will continue four or five nights.

May not therefore the phosphate be formed either from the exuviæ of fish, or from some secretion of the finny tribes mingling with the ocean waters. But this is a subject far beyond my research. I wish it may receive the attention of an able hand.

That sulphate of magnesia, and muriate of soda have something to do with the matter, is, I think, evident from the fact that in large masses of fresh water abounding with fish, and those even of the salt water kind, as Lake Ontario does no such appearance has yet been observed.

Art. IV.—*Notes on the Saguenay country, by Andrew Stuart, Esq.*

In the first voyage of Jacques Cartier, (A. D. 1534.) no mention is made of the Saguenay country.

In his second voyage (A. D. 1535) to be found in the third volume of Hakluyt, the Saguenay country is called "the Kingdom of the Saguenay." The *wild-men* pointed out to him "the beginning of this kingdom and told him that it was land inhabited, and that from thence came the red copper by them named Caignetadze."

Upon Jacques Cartier afterwards going to Hochelaga, (Montreal,) he shewed the Indians there some red copper, and looking towards the country of the Great Lakes, with signs asked them, if any came from thence, but they shook their heads and answered no, and shewed him that it came from Saguenay which he rightly observes, "lyeth clear contrary to the other."

Upon his return to his post of St. Croix, (probably Quebec, perhaps Cap Rouge,) he was informed by the Indians that the river Saguenay, at the distance of eight or nine days journey from its mouth would only bear small boats; that beyond the village of Saguenay, (it is difficult to fix the position of this village,) the river Saguenay enters into two or three great lakes; that there is a Sea of fresh water found, and, as they

were

were told by those of Saguenay, there was never man heard of "that found out the end thereof, for they said to us they never were there themselves." This corresponds sufficiently with the known geography of the country. The fresh water sea here referred to, is doubtless Lake Mistassinis, respecting which the story here given in 1535 was reported to us by the Indians of the King's Posts. The same story will be found in the examination of one or more of the witnesses examined before the committee upon the Crown lands.

Jacques Cartier was also told by the Indians about Quebec, that the inhabitants of the Saguenay had great store of copper.

On the 6th of May, 1536, Jacques Cartier sailed from Quebec on his return to France, stopped at the Isle aux Coudres, and remained there till the 16th of the same month, when many of the subjects (as he calls them,) of the Indian chief whom he was conveying to France, came to see their chief, and "gave him three bundles of beavers, and sea-"wolves skins, with a great knife of red copper that com-"eth from Saguenay,"

The fourth voyage of Jacques Cartier contains nothing respecting the Saguenay country.

Mr. Roberval, "the King's lieutenant general in the "countries of Canada, Saguenay, and Hochelaga, depart-"ed towards the province of Saguenay, on Tuesday the "5th of June, 1543. Their furniture was of eight barks as "well great as small, and to the number of three score and "ten persons with the aforesaid General."

On the 14th of June, Monsieur "L'Espiney La Brosse, "Monsieur Frête, Monsieur Longeval, and others, returned "from the General from the voyage of Saguenay.

"And note that eight men and one bark were drowned "and lost, among whom was Monsieur De Noire Lafon-"taine, and one named Lavasseur of Constance."

"On Tuesday the 16th of June aforesaid, there came "from the general Monsieur Villeneuve, Talebot, and three "others, which brought six score pound weight of their "corn

"corn, and letters to stay yet until Magdalen-tide which is "the 22d day of July." The rest of this voyage is wanting, (Pinkerton, vol. XII. p. 677. 8.)

There are two maps in Charlevoix which throw much light upon the Topography of this country; the smaller of them is to be found in his third volume, p. 64, and embraces the whole river from Tadousac to some short distance above Chicoutimy. There is delineated upon it a land road, between two chains of mountains, which leads from Lake St. Charles to a point on the Saguenay, as nearly as may be equi-distant from Tadousac and Ha Ha bay.

He here speaks of the harbour of Tadousac as a good one capable of containing a fleet of twenty-five ships of war, and says that the country is filled with marble but altogether unsusceptible of culture;—in both of which particulars he was mistaken.

His general map (vol. 1. p. 438), is compiled from manuscripts in the Dépôt of the French marine, and from memoirs of the Jesuit priests.

It is astonishingly minute and accurate, and what would at first sight seem to be extraordinary, it would appear from it that the interior of the Saguenay country was better known at that time than the interior of the country lying between Quebec and Montreal.

The rivers Batiscan, St. Anne, and Jacques Cartier, are very inaccurately laid down in this general map; as is also the St. Maurice.

It is worthy of remark that a water communication is laid down in this map from the Ottawa to the St. Lawrence by the Maskinongé river. This is probably correct, but there is reason to believe that the route is in a higher latitude than that given by Charlevoix.

The public documents to which Charlevoix had access, and which served to enable him to give so accurate a map of the Saguenay country, were (independently of the memoirs of the

the Jesuits of the most authentic character. The King of France had reserved to himself this country comprising the best hunting grounds in the whole of North America. It is said to produce furs of certain descriptions that are not equalled any where. This reserved tract of country was farmed out or let.

By an Arrêt of Council of 16th May 1677, and by a subsequent Ordonnance of the Provincial Intendant of 1720, an exact plan was ordered to be made of this country after actual survey; which was finally carried into effect between the years 1731 and 1733, (eleven or twelve years before the publication of Charlevoix's general map) as appears from the ordonnance of the intendant, bearing date the 23d May, 1733. (Edits and Ordonnances II. 87.)

The tract of country thus surveyed is bounded in front by the river St. Lawrence, beginning at the lower end of the Seigniory of the Eboulemens, and extending to Cape Cormorant, a distance of about ninety-five leagues; on the west by an imaginary line running east and west from the aforesaid lower end of the Seigniory of the Eboulemens, to the height of land at the carrying place of Lake Patitachekao in the latitude of 47° 15′; thence running west towards Three Rivers, and in depth to the height of land, at about two leagues from the small Lake of Patitaouaganichte, in latitude 48°, 18′; thence to the Lake Askatiche into which the former Lake empties itself, whence they fall into the river Nekoaba which receives also the waters of Lake Nekoaba all of which empty themselves into Lake St. John, and thence into the Saguenay, with all the country comprized within these waters; on the east by Cape Cormorant and thence to the height of land comprizing the River Moisy, Lake Kichestigaux, the Lake of the Naskapis, and the other Rivers and Lakes emptying into them.

In the collection of plates, plans, &c., representing a series of events in the history of France, commencing with the Gauls and ending with the reign of Louis the XV., made by

by Mr. Février de Fontette, and now in the King's library at Paris, will be found the following plans, &c., relating to Canada.

Under the year 1690, "Petite Carte du Canada, ou le Che-
" valier Guillaume Phips, fit une tentative inutile, les 10 et 19
" Octobre. Les Anglois canonent Quebec, le 10 Octobre."

Under the year 1758. Plan de Louisbourg en Canada, rendu aux Anglois le 26 Juillet.—Perier.

Under the year 1759, Plan de la ville et du siege de Québec, pris par les Anglois le 18 Septembre.—Idem.

Under the year 1760, Plans de la bataille de Quebec, les attaques du Fort Carillon du 8 de Juillet, de celle du Fort de William Henry le 7 Août, et de celles de Chouaguen le 12 Août.—Perier.

The foregoing are extracted from the Appendix to the 4th volume of the Bibliothèque Historique de France.

Upon the cession of the Canadas to Great Britain by the Treaty of Paris in 1763, this tract continued to be granted to lessees under leases of twenty-one years.

It was the interest of the lessees to exclude strangers as much as possible and to keep secret the resources of the country as well for the purpose of maintaining their monopoly, as for that of preventing competition, when the lease should come at the end of each twenty-one years to be brought to sale.

Accordingly, down to within the last six or eight years nothing was known of this country. The most ridiculous stories were circulated and believed of the dangers of the navigation of the Saguenay, of its falls which no man had ever approached, of its unfathomable depth, and of the severity of the climate, &c. &c.

The account given of this country before a committee of the assembly, to whom was referred the matter of the Crown lands, by two gentlemen of the highest respectability, the Messrs. Taché of Kamouraska, who had long resided there, first awakened the public attention to it,

An exploring survey of this tract of country, was commenced during the last season under the authority of an act of the Provincial Legislature.

It appears from the Report of the Commissioners employed upon the service and from the documents which accompany the Report, that the Saguenay is navigable by vessels of any size for a distauee of twenty two or twenty three leagues, to Ha Ha Bay, and that it is navigable by vessels of large dimensions for five or six leagues higher up to Chicotimy.

The harbour of Tadousac would contain it is said, twenty five ships of war. The following harbours there is reason to believe, are to be found between Tadousac and Chicotimy.

At La Boulle, about two leagues above Tadousac, is a good harbour for vessels against the north west winds, on the north east bank of the Saguenay, and a good harbour for boats, on the south west side at the place called L'ançe à la Barque.

At three leagues from Tadousac, at the place called La Passe-pierres is a good harbour for schooners against north west winds.

At the Bay St. Etienne, obout two leagues from La Boulle is a good harbour against north west winds; and opposite this Bay is the Bay à la Grosse Roche, which is a good harbour for shipping.

On the same side of the River is the Bay *Ottapermuche*, with a good harbour for boats, and at a small distance from it the Ançe aux Foins having a good harbour for schooners. Opposite the Ançe aux Foins is the River Ste. Marguerite, distant six leagues from Tadousac, having a good harbour against all winds.

About seven leagues from Tadousac is the Island of St. Louis, having a good harbour at each of its extremities.

A league higher we come to the River Petit Saguenay, which has a good harbour.

Half a league higher are the Islands Cocard and Barthelemy, having a good harbour.

A little higher is the Bay of St. John : a good harbour against all winds.

Higher up is the Bay du Rude ; a very good harbour.

Opposite La Trinité is the Bay à l'Aviron ; a good harbour.

La descente des femmes ; a good harbour for ships.

La Grande Pointe ; a good harbour.

Ha Ha Bay an excellent harbour.

The foregoing notes upon the harbours of the Saguenay, are extracted from the report of Mr. Gauvreau.

Upon the north eastern shore of the Saguenay, from Tadousac, to within one or two leagues of Chicotimy, there seems to be but little land susceptible of culture.

What extent of ground susceptible of culture, there may be between the old settlements in the rear of Murray Bay and St. Paul's Bay, upon the St. Lawrence on the one side, and Ha Ha Bay, and the Saguenay, and Tadousac, on the other is not known.

Between Chicotimy and the country immediately in its rear on the one side, and Ha Ha Bay and the waters which empty into it on the other will be found 300,000 acres of cultivable land.

Proceeding from Chicotimy to Lake St. John by the Chicotimy River, Lake Tsinogomi, &c., it seems probable that the country from Chicotimy to the foot of Lake Tsinogomi, on the western side of these waters is not susceptible of culture.

From Lake Tsinogomi to Lake St. John, there is according to the report of the Traders and Indians, a deep tract of level and fertile country, extending to the westward and southward.

Nothing, however, is known with certainty upon this point, as the Surveyor charged with exploring this portion of the country, was prevented by accidental circumstances from doing so.

From Chicotimy to Lake St. John, the distance by admeasurement is 67 miles, 68 chains.

The

The waters on the western side of the Peninsula, which lies between the Lake Tsinogomi and the grand outlet of Lake St. John, are generally navigable for batteaux &c. those which are now navigable only by canoes might probably at a small expense be rendered navigable by batteaux.

The following are the carrying places on this route.

Names of Portage.	*Length of Portage.*		*Water Communication.*	
	Chains,	Links,	Chains,	Links,
Chicotimi,	160	00	92	00
Maie,	10	00	62	00
Attim,	9	00	33	00
Washkou,	7	00	619	00
Melow,	13	00	99	00
Ministuke,	33	00	148	00
Assini,	20	00	1863	00
Weque,	96	00	476	00
Pashicounamish,	25	40	459	00
Melow-zebi,	18	00		
From Belle Rivière portage to entrance of Lake St. John,			365	00
From Kouapigan to the Post,			821	00
Distance of Land Carriage,			391	40
do. Water,			5036	00
			5429	00

67 miles, 68 chains, 00 Links.

The Grand Outlet of Lake St. John is a rapid stream navigable only by canoes, and even in these, dangerous to all but the most expert canoemen.

Upon the north easternmost shore of the Saguenay, there seems to be but little land susceptible of culture till within a short distance from Chicotimy.

The country was here penetrated for a distance of sixteen leagues from the mouth of the river des Terres rompues. The soil was found to be of superior quality in the whole of this distance, and this tract of good land probably extends to the north eastermost side of Lake St. John.

The Peninsula lying between Lake Tsinogomi and the Grand Outlet of Lake St. John, is reported by the surveyor to contain about 250,000 acres of level and fertile land.

On the south westernmost side of Lake St. John, the Mountains approach near to the Lake, and beyond them the whole country lying to the westward between Lake St. John and the St. Maurice is altogether unsusceptible of culture, with the exception of some few patches too inconsiderable to merit being particularized.

The north easternmost side of Lake St. John, contains much good land.

The following is a Table of the distances which the rivers emptying into Lake St. John, on this side of the Lake were ascended on the late exploring survey.

	Chains,	Links,	Miles,	Chains,
River Perebonca,	1700	00	21	20
Musk-rat River,	170	00	2	10
River David,	769	00	8	49
Rum River,	123	00	1	43
River Mistassini,	720	00	9	00
Koucciatien River,	40	00	0	40
River Baddeley,	560	00	7	00
River Pastagoutin,	480	00	6	00
Saguenay from Chicoutimi to Terres Rompues,	484	00	6	4

The following is a Table of Latitudes as taken by Lieutenant Baddeley of the Royal Engineers, with an artificial horizon.

Rivière La Fleur,	46°	53'	40"
Chicoutimi,	48	24	9
Portage des Roches,	48	14	31
About half way over Lake Kennawgommin,	48	16	22
Where two parties met Lake St. John,	48	37	59
Perebonca River,	48	42	37
Mistassini River,	48	38	55
Ouignatshouen River,	48	24	35
Mitabitshuan River,	48	23	12
Tadousac,	48	6	39

The climate at Chicoutimi, and lower down the Saguenay seems to be very much like that at Quebec, whilst it would appear that the climate of the country about Lake St. John, is as mild as that of Montreal, perhaps milder,

The survey made by the Commissioners was but a partial one, the funds at their disposal not admitting of any other.

To complete our knowledge of this Territory, it would be requisite

1st. To explore in every direction the country lying in the rear of Murray Bay and St. Paul's Bay upon the St. Lawrence on the one side, and Ha Ha Bay and the Saguenay on the other.

2d. To explore the country lying between Chicotimy and Lake St. John upon the western side of the River Chicotimy, Lake Tsinogomi, &c.

3d. To explore the old route from Charlesbourg to the Saguenay, striking the Saguenay half way between Tadousac and Chicotimy, as laid down by Charlevoix. (*doubtful*)

4th. To explore the country most likely to afford a direct communication by land from Quebec to the old establishment of the Jesuits upon Lake St. John, a distance of about 100 miles; through which country the Jesuits are said to have been in the habit of causing cattle to be driven from Charlesbourg.

Much as thus still remains to do, it is nevertheless true that enough has been done to establish, that there is a vast extent of Territory about Lake St. John, the Saguenay, and their tributary waters which it is desirable should be settled.

Art. V.—*Desultory Observations on a few of the Rocks and Minerals of Upper Canada, by Captain Bonnycastle, R. E.*

In the very desirable step which the Historical Society has at length adopted to commence the march of geological science in Canada, every reason is afforded for belief that a new and important opening will be made towards clearing away the incumbrances which have long overshadowed so fair a field for research, and that, not only will the country be ultimately benefitted and enriched, but that a new light may be spread over the science itself from the unveiling of those peculiar doubts and difficulties with which its study in this singular country is beset.

Among some of these hitherto unsolved questions which so naturally present themselves to an enquiring mind, is that of the manner in which the vast masses of foreign rocks, in the shape of water worn boulders, have been transported to their present situations and whence they came. The boulders of the Jura and of Germany, are of small import and of limited extent when compared to those of Canada. I have travelled by land or along the shores from Prescott to Lake Erie, and every where these singular strangers present themselves to view, thickly spread over rocks and soils to which they have not the slightest analogy, and at an immeasurable distance from any beds to which they might, in a few instances, be supposed to have originally belonged, I have observed them equally strewing the shores of the lakes and of the St. Lawrence, and covering the mountains and the hills, and that too as in Pelham township at a very considerable elevation. Here (at Kingston,) they line the low limestone shores of the lake, and consist of hard schists, of granites, of gneiss, of quartz, of

of black basaltic looking masses, and of nearly pure felspar. The granites on the higher plateaus of the limestone of Frontenac, are so numerous and varied, that I am confident in a few hours, above a hundred specimens of different kinds might be procured, but there are no *data* either from their form or their position, on which a theory of a plausible nature, as to the route they have travelled, could be drawn. The diluvian dressings, as they are rather affectedly termed, have been so variously rolled about, that the side on which these boulders have received the most severe chastisement is undoubtedly not recognizable. I have fancied that I could perceive there was a kind of regularity in their general position, but I cannot as yet speak with certainty. I conjecture that they are in nearly parallel lines on the flat tables which this part of the country affords, but I shall not hazard a statement until I have opportunity to enquire more largely. Altogether, the subject of the Canadian boulders appears to me, one of the deepest interest.

At Kingston, the mineralogical contents of the transported rocky masses are very interesting. Prase, schorl, varieties of mica, beautiful large crystals of felspar, garnets, and the other concomitants of gneiss, granite and sandstones may be readily found, whilst large blocks of quartz from the transparent limpid species, through almost all the shades to dark brown, exist; I have a piece of quartz from a rock which is under ground and is of course a boulder, nearly as pure as the Brazilian kind, having but a slight milkiness about it.

There are some amygdaloidal boulders here also, containing imperfect jasper, agate, &c., but they are merely curious from their present situation, and are very rare and much worn and disintegrated.

Although secondary rocks visibly prevail in the neighbourhood it is well known that Kingston is the great point where the pure granite range, which forms the Thousand Islands,

lands, and the country of the United States down to Lake George, again rises. Here a deposit of immense extent of beautiful red granite rears its head above the limestone range and forms Cedar Island, and the shores of Hamilton's Cove, while in the former place is observed, the unusual and unexpected circumstance of the granite, and the limestone mingling with each other, and that so intimately as to appear, even in a small specimen, the result of contemporaneous fusion; primitive limestone, therefore, exists here.*

Kalm, the Swedish traveller, has noticed similar calcareous granites in this country, and one near the St. Lawrence, he particularly describes as being composed of red felspar, black mica, white limestone with grains of purple or red quartz. Of another rock he says, that the absence of felspar is supplied by grey primitive limestone which, together with purple or garnet coloured quartz, and black mica it is composed of.

It was supposed that the granitic range from the United States, and Thousand Islands terminated at Kingston, but I feel inclined to think otherwise, and that this granite spreads onwards towards the immense primitive range, which divides the waters flowing into Hudson's Bay and the upper lakes from those which pay tribute to the mighty St. Lawrence.

The limestone of Kingston, contains in most instances but few shells and those mostly of one kind, a sort of scallop. I should not be at all surprized at some discoveries being ultimately effected here with respect to animal remains, as Hamilton's

* Captain Bonnycastle appears to allude to this rock in the following extract from another communication of his: « Here is the most singular junction of the granite, with I think a talcose limestone; these rocks actually intermix so, that the quartz and felspar of the granite may be seen separately in the lime, and the lime separately in the granite, far beyond the line where the two masses have actually been soldered together as it were. This is all made evident by having a surface smoothed and polished. There is not much schorl here but I have seen a little in the granite *in situ*. »

milton's Cove on its north shore is cavernous to a very great degree, the limestone quarter of Cedar Island is the same, and there are some tokens of vast caverns under Point Henry, as a stream, which is of some volume in spring, loses itself suddenly there in a chasm.

Orthoceratites and other organics are found here, the bivalves are, however, not very common, and the orthoceratites seem to belong to large slabs which have been transported, rather than to any rock *in situ*.

Chain coral (tubipora catenulata) madrepores and the honeycomb fossil (favoisite) are found on the islands in the vicinity, but not very perfect; and amongst other things a small slab was picked up lately, on which is the perfect appearance of a large plant in *alto relievo*, with some leaves beside it.

2. About fifteen miles from Kingston, in the township of Loughborough, galena and broad plates of mica, as well as carburet of iron, exist as I am informed. Pipe clay very pure is found near the forty mile creek in the Niagara district, and there is also a large bed of sulphur. Lead is found at Mud Creek, in the county, or rather township joining Pelham, and fine granular gypsum at the Grand River, in such quantities as to be common on all the farms in the Niagara district.

Selenite (crystallized gypsum) is found at Fort George, and at Beckett's Mills. At the Short Mills there is a singular declivity in the woods, which bears every appearance of having been an ancient waterfall; some water still oozes out of the rock at its base, and here are strewed masses of agatized wood and hornstone, apparently formed by the petrifying qualities of the ancient stream.

There is an extensive bed of iron pyrites in the woods at the Short Hills, and thereabouts occur crater like hollows, which may probably have been formed by the combustion of that mineral; the lips of the cups, however, are not high, and it is equally probable that these hollows may have been caused by the sinking of the sand.

In all probability there is a great deposit of magnetic iron near Kingston, as well as of other ores of iron; large masses are occasionally seen, and I have met with very pure ores in lumps as large as a man's head.

I propose to close these observations upon a few of the rocks and minerals of Upper Canada, by adding a mineralogical annalysis of the Marmora ores of iron, together, with that of a Kingston mineral which, I believe, has hitherto been considered erroneously to be tremolite.

I. *Magnetic oxide of Iron, Marmora, Upper Canada.*

This mineral is composed of large and small crystals in the mass, (sometimes though not frequently exhibiting the form of the octahedron,) generally strongly bevelled on all their edges. Colour externally iron black; on a fresh fracture, iron grey in spots. Fracture, uneven with cavities. Lustre, weakly metallic. Powder, under the hammer black; under the file also black; streak, metallic. Alone on charcoal very difficult to fuse. With borax, on platina wire, it first becomes red, then bottle green, and when cool it forms a transparent and colourless glass. With salt of phosphorus the same is observed. It strongly attracts the insulated needle.

This is the *granular* magnetic ore and exists in immense quantities on the Crow Lake, forming mountain masses. It is very valuable, and although it contains much sulphur, from the quantity of carburet of iron and argillacious ores found near it, its fusion is accomplished without great expenses.

N°. II.—*Red oxide of Iron and fibrous hornblende, Marmora.*

This mass has a laminar structure in the direction of the longitudinal fracture, but is very compact. The hornblende covers both faces of the flattish surfaces, and appears sometimes penetrating the mass. It has the peculiar odour of hornblende, a fibrous structure, resinous lustre and bituminous appearance; the fibrous structure when filed across its length

length is very distinct, resembling the grain of bamboo or cane. Its streak greenish gray. Insoluble in nitric acid. The ore itself has but little of the metallic look; and does not move the needle. External colour, dark brownish dirty red; streak, dark fine red; powder, the same, very fine and rather smooth.

The streak and powder are uncertain, being sometimes as above, at others the streak is brown grey, as well as powder, the hornblende being so intimately mixed with the mass. The results of fusion also vary. Alone it does not fuse on charcoal, but blackens with borax; the dark powder gives a dull red opaque glass; in the oxidating flame, wine yellow; in the reducing flame fine dark (green ?) colour, which becomes more green on cooling.

This variety does not appear to be very common, it is a curious specimen.

N°. III.—*Mountain ore (called also lake ore,) from the mountain it almost composes being near the lake, Marmora.*

This ore is a very massive looking variety with an even fracture and argillaceous appearance. In *nitric acid* insoluble. Colour of fracture, iron black or steel gray; it is generally coated by a light crust of brown oxide. Powder by file black; streak, metallic. Moves the needle, and is evidently *earthy* magnetic oxide of iron.

This ore is very abundant at Marmora, and is used for making the best bar iron there. It is probably inexhaustible.

N°. IV.—*Red ore, or ochrey red oxide of iron, Marmora.*

This has an earthy aspect; strongly soils the fingers of a deeper indian red than its own external colour, which is dull brick red, but when cut fine indian red. *Fracture* earthy. *Powder* dark red. *Streak* red and shines a little. Easily cut and broken. Nitric acid changes the colour of the mass, or appears to discharge it. No other effect from dropping the powder into nitric acid than a metallic scum arising and floating on the surface.

This is a variety of the *colour red oxide of iron*, and might be made use of as a pigment, for which purpose it is indeed sometimes sold at Marmora, at the rate of 25s. a ton. It may perhaps be rendered useful in the arts as its qualities are much the same as that brought from the gulf of Ormus. At Marmora it is abundant, and is used as a strong flux for the best ores. Its effects, in this way are represented as very great.

N°. V.—*Irregular mass; apparently epidote and decomposing Felspar, Marmora.*

A green substance in distinct crystallizations intersecting. Fracture crystalline and laminated longitudinally; cross fracture uneven. *Powder*, greenish gray, and harsh to the touch. Does not yield easily to the knife, and has a greenish gray streak. Opaque, or feebly translucent at the edges in thin laminæ. Fresh fracture has a lustre almost metallic, shining and vitreous, or slightly resinous. Does not fuse easily, or scarcely at all, on charcoal, but in forceps in a thin scale, it fuses with difficulty on the edges into a round black, dull, enamel, here and there. With borax, on platina wire, intumesces, and yields a glass of a yellowish colour. Crystalline cleavage in two directions, longitunal and diagonal.

There is also I think some hornblende and much iron in this specimen. Rocks of this nature appear abundant in the porphyritic sienite of Marmora.

N°. VI.—*Argillaceous carbonate of iron, Marmora.*

Yellowish brown, sparry looking masses, with an uneven fracture, and crystalline structure which is lamellar, and resembles calcspar, having a shining pearly lustre when turned to the light. *Streak* very easily effected, and of a light brownish yellow or yellowish white colour. *Powder*, rough and very red. The powder when fine on the finger moves the needle faintly. Effervesces in powder strongly; when thrown into nitric acid a bright red heavy powder subsides, and a metallic scum rises. Decrepitates on charcoal, and falls into a metallic dull red powder. I

I should call this an argillaceous carbonate of iron, or argillaceous sparry iron ore. I believe they think it is yellow ochre at the Marmora works.

N°. VII.—*Clayey iron ore, Marmora.*

Earthy, uneven, irregular masses resembling some kinds of graphic clay. *Colour* green grey, slightly glimmering. *Streak*, greenish grey. *Powder*, darker greenish gray. *Alone* on *charcoal*, it becomes powdery, and rising up a little turns reddish brown and crumbles into dust, parts of which look metallic, but does not readily fuse. *With borax* on platena wire, it is very difficult to fuse, but turns at last into a beautiful light green glass which on cooling fades. During the process the essay becomes bright red hot in points. *With salt of phosphorus* it is also difficult of fusion; at first it forms a red globule which turns gradually a dark bottle green, then a fine light green and becomes a colourless glass on cooling. *Not effervescent in acids*, nitric, muriatic nor sulphuric. I should call this specimen (which is very common at Marmora, and is called a coarse *black lead* by the workmen,) green argillaceous oxide of iron, from the peculiar bottle green colour it developes. Perhaps there is some chrome in its composition which gives it its slightly green hue in mass.

It resembles in its qualities the indurated green iron earth of Jameson, Hauy's fer oxide terreux. supposed by some, according to Cleaveland, a phosphuret of iron, and of rare occurrence.

It affords a greenish black trace on paper with pressure, but none on white porcelain, and feels very slightly greasy. When moistened by breathing on it, it gives out a strong argillaceous odour.

N°. VIII.—*White and light blue radiated and bladed sulphate of barytes, Kingston.*

This mineral exists at Kingston, in the upper beds of a compact dark limestone with very few, or rather scarcely any, shells. These upper beds appear to have been subjected to

some

some convulsion as they are much broken and irregular, differing also in their aspect from those on which they repose, aud passing by exposure to the oxygen of the air, or some other operating cause, into a dull whitish (argillaceous) grey looking substance.

Calcspar commonly is in conjunction with the barytes, and is sometimes red or of a pale flesh colour, but the whole specimen is very frequently much decomposed. Nodular masses of this barytes, coated by argillaceous lime of a dirty light brown colonr, and of the size of a cocoa nut, are also sometimes found on the surface of the exposed beds.

I have been particular in the examination of this mineral, because I suppose that it is the substance which has long passed at Kingston under the designation of tremolite. Its obvious great specific gravity might have prevented this mistake.

Structure bladed & radiated; the plates or blades very long and intersecting in broad rays, leaving interstices. *Fracture* crystalline, and, in the direction of the rays, lamellar and shining; across them uneven, powdery and dull. *Lustre*, fine white and shining, rather vitreous. *Powder*, white, & harsh, and also breaks into little long spangles on slight trituration. *Streak*, white. Scratched by fluor spar and in some places, by the nail. *Not affected by the acids* nitric, muriatic nor sulphuric, neither in mass, powder nor spangle. Alone on charcoal it is very difficult of fusion; in a thin lamina it turns white, and transparent on cooling, at the first blast; on the next turns again lime white, and gives out an intense and beautiful white light, after which it separates, swells a little, and fuses into an irregular dull, but fine white, enamel, which when cold and placed on the tongue, gives the peculiar disagreeable taste of sulphuretted hydrogen and after a few hours becomes soft and powdery.

Art. VI.—*Geology of a portion of the Labrador Coast, by Lieut. Baddeley, Royal Engineers.*

Very little is known of either the geology or mineralogy of any portion of the coast of Labrador, and for that little we are almost entirely indebted to the Rev. Mr. Steinhaeur, extracts from whose communication on the subject to the Geological Society of London, will be found at the end of this article.

In the autumn of 1827, Capt. Campbell, h. p. 79th Regiment, visited the coast of Labrador, from Bradore to Chateau Bay, and brought back with him the necessary materials for affording the following report, which he kindly placed at my disposal.

On the island of Quirpon, about one hundred yards to the north of Newfoundland, quartz rock was observed, forming a thick continuous vein or stratum running north east. It is remarkably pure, white, compact and deeply translucent on the edges. A tendency to the formation of regular crystals appears in some hollows and nests in the mass.

These crystals when near the external surface of the rock, are often characterized by having beautifully polished faces, as if they had been operated upon by the lapidary's wheel; the same is also observed of some portions of the surface, which exhibit no tendency to regular crystallization. Dr. MacCulloch has noticed the same fact in his paper on Quartz Rock, page 480, vol. 2, of the Geological Transactions.

At Cape Charles, on the Labrador coast, immediately opposite, the same rock was observed, and under similar circumstances.

At Francis harbour, on the Labrador coast, an aggregate composed of quartz and calcareous spar, forms a continuous seam

seam or thin stratum in micaceous schist, which, according to Capt. Campbell, is common to most of the rocks from Bradore to this place. The quartz of this aggregate projects in ribs, as it were, from both the otherwise flat surfaces of the seam. It is white, translucent and compact. The calcareous spar is also white, but its laminar structure, greatly inferior hardness, and violent effervescence in acid, remove any doubt as to its nature.

The micaceous schist alluded to above, rises in steps to a considerable height from the water; nothing is known of its stratification, but only that it is associated with granite of a beautiful description, composed of white decomposing felspar, silver mica, and grey quartz, the felspar being occasionally stained or invested by a mineral of a brick red colour.

Granite, containing large crystals of black mica, was also brought from an island near Square Island harbour.

A granite, in which the felspar greatly predominates in large crystals of a white colour, was found to be the prevailing rock at Cape Charles, Battle harbour, and lying above one of a sparkling character, (micaceous schist?)

A very siliceous limestone occurs at Bradore. An indurated calcareous tufa, probably derived from the disintegration of the foregoing limestone, is found incrusting pebbles lying in the sea at this place.

A beautiful aggregate, composed of flesh coloured crystals of felspar and green hornblende, a syenite, was observed, forming veins about one foot wide in a rock, which is described as being dark and of a bluish colour, (basalt?)

On an islet called Castle Reef Rock, in Henley harbour, Chateau Bay, a rock, composed of a mixture of felspar of a dark purplish grey colour, a very fusible green hornblende, and grey quartz, occurs, apparently, underlying basalt. The felspar is remarkable for the almost splendent semi metallic

lustre

lustre on the frequently striated faces of the laminæ of which it is composed, and strong resinous cross fracture.

The basaltic formation before mentioned, is thus described.

* Upon entering the harbour it has something the appearance of a fortification. The upper portion consists of a mass of amorphous basalt, fifty feet thick, 990 feet long, and 210 feet wide, in its broadest part, which is in the centre. This mass is supported by an aggregation of basaltic columns, the greatest height of which, is 25 feet. The smallest periphery to any one of these is two feet, and largest seven feet six inches. The position of these columns is vertical or nearly so, (not any were observed inclined to the horizon, bent or curved,) and in close contact one with the other. They are jointed at every foot or one foot six inches. They vary in the number of sides. Capt. Campbell saw them of five, six, seven, and eight sides; one he measured was an irregular pentagon of 6 feet 6 inches, in periphery; another he brought home has eight sides (the smallest may perhaps be esteemed only a truncation,) and it is remarkable for possessing the process described by MacCulloch. (pl. 5.)

The base of these pillars is 180 feet above the water; from the former in most places the ground slopes off at an angle of 45° to meet the latter. The method adopted, unaided by the use of instruments, to ascertain the height of this slope, should be generally remembered. Having taken a boat-hook which he found to be 15 feet 6 inches long, Capt. Campbell fixed a cross piece, about six feet in length, at right angles, to one end; then forcing the other, or pointed extremity, into the ground, at the waters edge, he plumb'd the boat hook to ascertain that it was upright. He then ascended the hill until his eye was in the prolongation of the cross piece, when the

* The sketch (pl. 4.) was reduced by a friend, from one Capt. Campbell brought home.

the boat hook was removed to the place where he stood, and the same thing repeated. By ascending in this manner, it took eighteen stations to reach the top of the slope, which multiplied by the height of the boat hook, *minus* the height of the eye (in this case 5 feet 6 inches,) gives a product of 180 feet, which added to 75 feet, the sum of the height of columnar and amorphous basalt, previously measured by dropping a line from the summit, makes a total height above the sea of 255 feet.

In some places the upper part having fallen away, the columns under are left without any other burthen to support than that of their own weight; in these cases it is often possible to push them over with the foot, by climbling up and going behind them. The summit is flat and covered with moss and turf; its shape is oblong, and it is widest in the middle. The columns pass all round, and there is only one way of reaching the summit.

This formation extends to another island to the westward, called Saddle Island, from which, Castle Reef Rock is divided by an arm of the sea, called by the fishermen Castle Reef Tickle. The width of this arm is not more than 120 yards, and its depth is sufficient for the largest vessels,

There is no essential difference in the basaltiform appearance of Saddle Island; the occurrence, however, of three caves, on the side towards the sea, affords, upon an examition of them, strong presumptive evidence that these columns traverse the mountain, and with the same regularity and close juxta position they exhibit on the outside. The deepest of these caverns was found to be 20 yards deep by 15 yards wide in the middle—the floors were strewn with the fragments of columns, and the sides were ornamented by those which their removal exposed to view—the ceiling was as smooth as that of a room but of almost an iron blackness. The thickness of amorphous basalt above was from 30 to 40 feet.

The

The course of this formation is east and west, and the columns to the westward are of longer dimensions than those to the eastward.

Mineralogical analysis of basalt from the Coast of Labrador.

* Colour, bluish black; externally it is yellowish brown. Opaque. Structure, compact granular. Fracture, slightly uneven, somewhat conchoidal, it scratches glass, but yields to the knife, Colour of streak light grey. Magnetic before the application of heat—No apparent action in acids. Sp.Gr. 2·9. Before the blowpipe it forms a shining black globule of enamel. A yellowish green mineral, supposed to be olivine, is disseminated in spots through the basalt.†

Extracts from the Rev. Mr. Steinhauer's notes on the Geology of the Labrador Coast.

"According to the descriptions of those who have had an opportunity of contemplating this inhospitable region, it consists almost entirely of barren rocks, towering in craggy eminences, on which even the lichen in vain endeavours to fix a habitation; for moisture enters the rock with its fibres; the cold of winter congeals that moistnre, and the summer's thaw precipitates the loosened fragment and its tenant to the foot. These fragments mouldering into sand, afford in some places support to a few species of pines, and the annual decomposition of their leaves, stains this earth to the depth of a few inches with a blackish hue. In other spots where the thawing snow occasions an accumulation of water, sphagma and other mosses form a species ofturf, and conceal the barrenness of the land; but every were the plucking up a tuft of vegetation, or removing the withered leaves, discovers either the bare rock or a bright silicious sand. In several parts of the country the rocks are intersected by chasms running generally in a right line

* The part within the ferruginous band, represented in the plan is modified by the rust of iron.

† A black pumice full of perfectly round pores, was found floating on the sea at Bradore.

line to a considerable distance, as if intended to be the receptacle of future veins; the floor, as I am informed, is composed of a different species of stone from the side, and generally of a lighter colour; but I could not, from the description, ascertain whether it was calcareous or not. These clefts when covered with snow in the winter, sometimes prove dangerous pitfalls to the unwary wanderer who does not know how to avoid them by the line of bushes (vaccinium, ledum &c.) which fringe their margin. Indeed the narrow passages which divide the coast into numberless islands, almost seem to be similar chasms occupied by the sea, few, if any, of those islands being alluvial, but high barren rocks, appearing from the sea like continuous land.

"The highest mountains seem to extend along the eastern coast; the names and situations of the principal, known to the Missionaries, are

The Nachwak chain, about lat. 59°.

The insulated mountain, Tupperlik, (the tent) lat. 58° 15'.

The Kaumayok chain terminating in the high island of Cape Mugford or Grimmington, lat. 58°.

The high land of Kiglapyed in lat. 57°.

The Mealy mountains laid down on Lane's survey of the coast of Labrador in lat. 53° 50'. and said to be never free from snow; they have not been visited by the Missionaries who now seldom go far to the south of Hopedale.

"With respect to their actual height, little can be said with certainty, but as Mount Thoresby, on an island south of Kiglapyed was ascertained by the officers of H. M. S. Medusa and Thalia, to be 2733 feet, and the Kiglapyed is evidently higher, yet inferior to the Kaumayok and Nachwak heighfs, the latter cannot be assumed at less than 3000 feet. This supposition gains additional probability, from the circumstance that the Kaumayok has been seen by Capt. Frazier at a distance of upwards of 30 leagues from land. The mountains to the west of Cape Chudleigh are much lower, and according

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ing to the accounts of the missionaries, of a *different nature*, but wherein the difference consists we are unable to determine.

"From the islands near Cape Chudleigh we have received specimens of large-grained pale *granite*, with garnets. The island of Ammitok (about lat. 59° 30') is described as consisting almost entirely of a crumbling granite, sometimes mixed with hornblende. The mountains of Nachwak about Nackwak Bay, furnish considerable quantities of * *lapis olluris* generally of the grey kind, but sometimes of the semi-transparent green variety. The missionaries describe the southern part of the chain, as exhibiting a very singular appearance towards the sea, being composed of alternate layers of black and white rock in a vertical position, which makes the cliff seem striped, the black strata are about five feet in thickness, the white double that breadth. Nulletartok bay, still farther south, and probably near the extremity of the same chain, has been called Slate Bay, from a stratum of slate, which appears there a little above high water mark; from this stratum the travellers write, that an acrid liquid of a strong sulphureous smell, exudes, which seems to indicate an impregnation with sulphuric acid. Below high water mark, in the same bay, they noticed a stratum, which they describe as resembling † cast iron, with a glossy, somewhat reddish, surface, and extremely hard. The north side of the Kaumayok mountains consists of a white stone with black or grey veins resembling ‡ statuary marble, but very hard. Of the productions of the Kiglapyed we have no account, but to the south of this chain the district commences, where the Labrador felspar is found. This stone was first distinguished by

* Potstone, variety of Stealite. Lt. B.

† Magnetic iron? Lt. B.

‡ Quartz rock? Lt. B.

by the late Rev. B. Latrobe,* among a number of specimens sent to him; it occurs not only in pebbles on the shore, but in spots in the rocks in the neighbourhood of Nain, particularly near a Lagoon, about 50 or 60 miles inland, in which Nain north river terminates. Its colours, darting through the limpid crystal of the lake, and flashing from the cliffs, more especially when moistened by a shower of rain, changing continually with every alteration in the position of the boat, are described as almost realizing a scene in fairy land. The same district produces also the Labrador hornblende, (hyperstene) and a white stone striped with green, which seems to constitute a rock on an island near Nain, and was first noticed by the Rev. C. J. Latrobe, among other fragments, which induced him to cause large fragments to be broken off and brought over.

"One of the mountains in the vicinity of Nain, (as well as several others in different parts of the coast,) exhibits a species of † Mam-tor, continually crumbling away, and shivering down into the valley below.

"The island of Ukasiksalik, free stone island, has derived its name from the quantities of lapis ollaris found there. It is probably the most southern place on the coast where this mineral occurs, as the missionaries who first visited the Eskimos in Chateau Bay, in the straits of Belle Isle, were told by them that they procured the stone of which their lamps, pots, &c., were made from this island.

"At Hopedale the secondary limestone seems to come in; at least we have received from that place fragments of reddish carbonate of lime, calcareous spar, and schiefer spar. Mr. Latrobe also possesses a madrepore, said to have been found there. It is remarkable that the river abounds in fragments of

* President of the Society for the furtherance of the Gospel established by the brethren.

† A mountain in the Peak of Derbyshire. Lt. B.

of stone, worn into the most fantastic shapes, in which the imagination without great exertion may trace the rude resemblance of birds crocodiles, &c. They sometimes form rings six or eight inches in diameter, and three quarters of an inch thick. Their great abundance precluded the possibility of their being the work of art.

With respect to the land west of Cape Chudleigh, as it has been but once vesited, we cannot expect to learn much about it. The mountains of Torngarsuir (the evil spirit) in lat. 60° are described as rugged, barren and black, and containing a huge cavern which the heathen Eskimos fable to be the habitation of the devil. The rocks further north are light coloured but there appear to be no mountains of considerable height on this part of the coast which is called Unguva. On almost every part of it fragments of a red jasper impregnated with iron, are frequent and in some places hæmatites and cubical pyrites. It may be worth remark that the tides rise here no less than from 40 to 50 feet, while they seldom exceed 8 or 10 on the eastern cost. The current sets from west to east round Cape Chudleigh, (Geological Transactions, vol. 2.)

Art. VII.—*Lieut. Baddeley on the geognosy of a part of the Saguenay country.*

THE materials for forming this geognostical essay were procured while attached to an Exploring Party, which left Quebec in the summer of 1828, on a journey through the Saguenay Country, to collect information as to its capabilities for settlement.

Upon a perusal, it will be found to require much indulgence, partly on account of the inexperience and limited information of the

the writer, on the subject in general, and partly owing to the short period allotted for observation. This indulgence, it is hoped, will be readily granted by the reader, when he is informed, that it has been written without assistance, and by a person, as he will soon ascertain, totally unpractised in book-making.

As this is considered by the writer merely as a sort of appendix to the more important and comprehensive reports of Ensign Nixon, 66th Regt., Messrs. Bouchette, Hamel and Davis, he has omitted as superfluous, most of the distances and courses, &c., retaining only the latitudes of those places where he had reason to think his observations were correctly made for determining them, and referring the reader for the relative position of places, to the accompanying plan.

As this paper will be unaccompanied by any of the Reports alluded to above, it becomes necessary to introduce it by a rapid sketch of the country it treats of.

The country through which the following report professes to be a geognostical section, is situated at a variable distance of from 100 to 200 miles from Quebec, commencing a little west of a line due north of that place, and passing through all the points of a segment subtending an angle of about 50°, as far eastward as the mouth of the Saguenay, which lies 65 leagues north-east of that place. The principal topographical features observed while moving nearly on this segment, are embraced in the following description:—

Lake

* The term geognosy and its derivatives have been used in this essay to imply a *knowledge* of the names of the rocky constituents &c. which form the crust of the earth, derived from consulting their mineral contents, physical structure &c.

By geology &c., is meant not only this knowledge, but the still more *scientific* one which points to the relative ages of these rocks, &c. and to the probable manner in which they have been formed. The geognist informs us, for instance, that such a rock is a syenite or trap; but it is the geologist who explains whether it belongs to the primary or overlying class &c. &c. The former may collect facts; but it is the latter who must reason upon them—no man can hope to be the second until he has become the first. We do not stop to inquire if this distinction be correct but rather beg that it may be conceded to us on this occasion.

Lake St. John is a natural basin or reservoir, occupying the most northerly portion of the country alluded to, into which radiate, with generally rapid courses, several rivers. The greatest breadth of this lake is measured nearly on a due north line from the post of Metabetchuan, and is equal to a little more than nineteen minutes of latitude*. It is of a rounded form and remarkably shallow. The only outlet to this lake is on the side to the eastward of south; and here it may be considered that the Saguenay river commences, which pursuing a direct, violent, dangerous, and contracted course for about twenty-five leagues, suddenly expands by meeting the tide, into a noble and navigable river, second only in Canada to the St. Lawrence, with whose waters it ultimately mingles its own, passing in its course to the latter river over a farther distance of 25 leagues, and through a section of rocks from 200 to 1000 feet in altitude. The breadth of this river, in the navigable portion of it, varies from half a mile to three quarters of a league, and its depth is in most places considerable.

At the upper end of these navigable waters, and where the tide rises upwards of eighteen feet, the Chicoutimi river enters the Saguenay on its right bank from the southward of west. It has its source in Lake Kenwangomi, between which and its mouth there are five or six portages; it would otherwise be navigable for batteaux. By this route in canoes Lake St. John is reached, the more direct one by the upper waters of the Saguenay being impracticable. Lake Kenwangomi is about five or six leagues long and so narrow as to resemble a wide river rather than a lake. Like the Saguenay its course is generally from the northward of west. It is separated from another lake called

* It was made much more by the Deputy Surveyor General, but as he possessed no other instrument for making observations than a theodolite, we may perhaps without arrogance prefer our own, which were made with an excellent sextant of eight inches radius, by Gilkerson, and an artificial horizon.

called Kenwangomishish by a species of dividing ridge about half a mile wide, which separates the waters flowing southward directly into the Saguenay, from those which, by pursuing a northerly course, first enter Lake St. John; a topographical feature of rather unusual occurrence.*

We will not further anticipate what will appear in the body of the essay, but without more preamble, will now proceed with the description of the rocks which were met with on the route, in the order they came under observation, trusting that it may afford the experienced geologist the means of fixing their geological positition,—an attempt we have seldom presumed to make, and where made, it is with the diffidence and hesitation compatible with our want of experience and knowledge on the subject.

The rocks on the Island of Orleans, wherever we have seen them, are composed of alternating strata of clay-slate and grey wacke. At Patrick's Hole, which was reached about 10 A. M. of the 6th August, these rocks appear alternating with each other, in very distinct strata, the dip of which, when not vertical, is either to the east or west, at an angle of from 60° to 85°. Here the grey wacke predominates, and rising beyond the thin strata of clay-slate, owing to the greater resistance the former opposes to the action of weathering, forms on the shore natural low stone walls, parallel to each other. It is probable that a good building material may be procured at this place.

As the term wacke has been applied very loosely to rocks of very different characters, we will here describe the mineral contents, &c. of the one to which we have applied this name:—

Its

* For further information on this interesting tract of country, consult the reports of the gentlemen before mentioned, but particularly those of the House of Assembly, elicited through the exertions of Andrew Stuart, Esq., to which indeed we are indebted for all that is known of the country. See also article 4 of this work.

Its prevailing colour in the neighbourhood of Quebec, of which it is a characteristic rock, is greenish grey. It possesses a mechanical and granular structure, being composed of rounded grains of quartz, thickly distributed through a base of indurated clay; these are sometimes large enough to render the term pudding stone applicable to it. Small white crystals of felspar and small angular pieces of clay-slate are occasionally seen in it. It is almost always characterised by a great degree of solidity and infriability, and could never be mistaken for one of the latest sandstones. The grey wacke of Cape Rouge is an excellent building stone, and has been much employed in the scarps of the new fortifications at Quebec. Although the predominating rock, grey wacke, is comparatively rare among the *debris* or shingle on the shore, owing to its power of resisting the disintegrating action of the atmosphere; while clay-slate, for a contrary reason, covers the shore in angular fragments.

These two rocks continue without interruption, as far to the westward as the Telegraph, from the neighbourhood of which Messrs. Nixon and Bowen brought specimens of the latter, much discoloured by the red oxide of iron, and containing small rounded nuclei or nests of magnetic iron. These gentlemen report the soil over which they passed, to be sandy and much neglected, a description that will apply to most of that we saw on this island. A few yards beyond high water mark, the rocks suddenly emerge, and form a bank about fifty feet high, running parallel to the river. Having walked about a mile to the eastward of Patrick's Hole, along the shore, no important geological change was observed.

At river La Fleur, off which adverse winds obliged us to anchor, the same rocks were observed; we here learnt, however, that limestone is found in the adjoining parishes of St. François, to the eastward, and St. Laurent to the westward, at the latter of which places lime is burnt for the supply of the

the island. We here made a small excursion inland, for about two miles, on a N. W. course, without observing any thing more remarkable than an isolated ridge of grey wacke, suddenly cropping out and dipping to the S. E.* at an angle of from 50° to 60°. Upon our return we took the Sun's Meridian Altitude, and found the latitude to be 46° 53′ 40″.

Leaving river La Fleur, we came to anchor again off La Grosse Isle, on which we passed the night. This island we were informed belongs to the Ursulines, and is about three quarters of a league long, by about 550 feet wide, but being almost entirely a bare rock, one farm only, of about 90 acres, is under culture upon it. Having reached this place very late at night, and quitting it very early in the morning, our geognostical observations were necessarily very scanty. The rock we believe is grey wacke. It is covered with a grey lichen, and bears the appearance externally of a solidity it does not possess, at least in the places examined, as it readily broke under the hammer, into tabular pieces, with oxidated surfaces. The obscurity of the weather and time at the period of observation, together with the absence of the specimens collected, which were left behind, will not allow us to describe with confidence. The outline of the island is craggy and irregular.

Passing to the southward of the island, in descending the St. Lawrence, several islands, viz: Marguerite, Cochon, &c. &c., some of them mere isolated rocks, were observed on the left hand, and which have the appearance of being also of grey wacke.

We lay off the mouth of the Saguenay on the morning of the 9th of August, at a conjectured distance of from 9 to 12 miles. The highest point of land on the western side of the entrance into the Saguenay at this distance, subtended an angle of

* This is the prevailing dip on the northern shore of the St. Lawrence; it is frequently reversed on the southern.

of 1° 12′ 44″. No approximate height could be expected from calculating with such imperfect *data*; they were employed, however, and by one calculation, in which 12 miles were assumed as the base, the height was found to be 919 feet; by another, in which the base was 10½ miles, 805 feet were obtained: the former agrees nearly with the result of an observation less liable to prove erroneous which was taken subsequently at the post of Tadousac.

Upon landing at this place (Tadousac) we proceeded immediately to examine a few of the geognostical characters of the country. The only place of residence here is erected on a bank of sandy alluvium, elevated about 50 feet above the river, and forming a flat terrace at the base of the mountains which suddenly emerge at a short distance behind. The rock of which these mountains is composed is granite, either of a red or a grey color, depending upon that of the felspar. It contains very little mica, but sufficient to make it a genuine granite, a rock as will be seen of rare occurrence among those about to be described. It crops out in cuboidal masses, and possesses sometimes the probably fallacious appearance of being stratified. At the foot of this granite, a small stream drains a tolerably deep section of the before mentioned alluvium, which is crowded with water-washed fragments of crystalline rocks. On the shore were seen small deposits of magnetic iron. Here bases were measured, and the requisite angles taken for determining the height of the most elevated land on either side the mouth of the Saguenay, which was found to be 912 feet on the western side, and 588 feet on that to the eastward. These results are approximations only, as the observations from whence they are derived, were not taken with the utmost precision.

Leaving the harbour of Tadousac and proceeding to the eastward round the clayey precipice of Pointe-aux-Vaches, which is the most southern portion of the alluvial plateau before described,

scribed, we reached a small bay, at the bottom of which the Moulin a Baude rivulet enters the St. Lawrence, at the distance of about three miles from the Post. It is here that the bed of white marble is situated, which has already excited much attention. We visited this place late in the evening, and could only spare ten minutes to its examination. It lays in close contact with syenitic gneiss, a rock composed of white felspar, grey quartz and black hornblende; the latter of which minerals it is, that by its arrangement in parallel seams and layers, makes the term gneiss more applicable to it than granite; these seams and layers indeed are sometimes so thick, and always so continuous, as to merit the name of alternating "hornblende schists" of Macculloch, if an aggregate, in other places in the neighbourhood, of so intrusive a character, and on that account agreeing better with one of his "overlying" rocks, can be admitted among that class. The fracture of the rock is effected more readily in the direction of these seams than elsewhere, and the surface thus exposed has a black pseudo metallic brilliancy, resembling some micaceous schists, for which at the first sight it might be mistaken, but the easy fusibility before the blowpipe, into a black shining globule, of that mineral which sometimes resembles black mica, is a sufficient distinction.

But to return to the marble: At its junction with the gneiss, it is much entangled with it, and it is stained in many places of a greenish color. Conformable to the accompanying strata it dips to the S. W. at a high angle, and crops out in yellowish white water-washed masses on the shore, at the bottom of a precipitous cliff, where alone we saw it. None of the specimens examined could be considered of excellent quality, as they were much stained and bastardised by what was supposed to be either hornblende or epidote; besides they are of a laminar, and not of that granular, structure which bestows on the white Italian marbles their greatest value, by causing them

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to work freely in any direction. We had no leisure to ascertain the quantity in which this marble occurs, but this deficiency of information is fully supplied by the following anonymous communication, which there is reason to think generally correct:—

"TADOUSAC, Sept. 14, 1826.

"We walked this morning along the beach to Moulin a Baude, about four miles below this Post, to see the bed of marble there. Point Rouge, forming the south-east promontory of the harbour of Tadousac, is chiefly composed of a very hard close-grained red granite. The granite alternates for a few paces with, and is then followed as far as Pointe-aux-Vaches, by several varieties of primitive rocks, principally gneiss, &c. until they are there met by a bed of clay, apparently one hundred and fifty feet thick above the level of the river, and cut down nearly perpendicularly by the beating of the waters for a distance of about two hundred yards, which is the whole breadth of the bed. This clay is of the same character as that at Pointe-aux-Bouleaux. (*) The primitive rocks of the same description which were found laying against the clay, almost immediately succeed it, and the action of the water discloses to the passenger that fantastic and beautiful intermixture of layers of different colours, so common between Malbay and the Saguenay. The shore is then indented, and a bed of gneiss, stretching out into the St. Lawrence, has been cut off by the water and forms a little island; opposite to it is a bay, and in the dry sand thrown up

(*) "The clay at Pointe aux Bouleaux and Pointe aux Vaches, the two outermost tongues of the banks of the Saguenay at its mouth, occurs in immense beds, of which that at the first place is about thirty or forty feet in thickness above ground, and that at the last place probably two hundred feet; both together extending in superficies apparently ten or twelve miles. It is extremely fine in its texture, contains a good deal of lime and some iron. It has the property of crumbling when water is thrown upon it, as unslaked lime does, and might by being merely spread out and exposed to the falls of rain, answer as an excellent manure for a soil having an excess of acid, such as that of swamps, &c." *Samuel Neilson, Esq.*

up, the wild oats grow so profusely that they almost appear to be sown by man. A larger bay a little farther on is what is called Moulin a Baude; it is about one hundred and fifty or two hundred yards deep; and at its bottom is the bed of marble. This bed is nearly vertical, rising within view to the top of the bank, which is here scantily wooded and about one hundred and fifty feet high, ascending at an angle of about 70°. The direction of the bed is nearly N. (NW?); the breadth along its whole exposure varies from six to eight or nine feet, disappearing under ground without diminution. In some parts it is interlaced by the adjacent strata, (gneiss), but it is generally pure and solid. A small stream falling down the bank has intersected it, and disengaged a large block or two which have been exposed to the water and frost; they do not appear to have been much affected by this exposure; indeed they have resisted it exceedingly well. Supplies of many thousand tons might be obtained at a trifling expense. As a statuary marble it will be very valuable, for it is, generally speaking, of a pure white colour, although to the depth of a few inches from the adjacent strata it is often tinged green, and in a few parts of the mass there is a red tinge(*). This muddy bay is dry at low water, affords a protected harbour, and admits at high water vessels drawing six or eight feet. A vessel of the former draught might indeed touch the bed itself with its keel. The entrance from the St. Lawrence is not difficult. It is not more than forty-eight hours' sail from Quebec with a light fair wind. Large sound blocks of the marble, of fifteen or twenty feet in length by four or five feet wide, might, I think, be obtained: these would be fine ornaments as columns, &c. to buildings. As the marble does not take a fine polish, it would not be so much

(*) As a statuary marble it is totally unfit; whiteness alone is not sufficient; it should also possess a granular structure. Those marbles are best for that purpose which, like the Carrara marble, resemble the finest white sugar.

much in request for chimney-pieces, &c. It well deserves to be worked. The discovery of marble at this place is not a very new one. Charlevoix, who anchored here in 1720, in the Chameau, a French King's-ship, landed at the small stream at the bottom of the bay, and it is probably in allusion to this very bed, which he could not have failed to see, that he says, in speaking of the place, 'tout ce pays est plein de marbre.'(‡) The marble in question was long ago known to the North West Company."

It is a curious fact, that this marble was bought for gypsum; the purchaser, as we are informed, on the most respectable authority, ground it up for cement, and found it to answer very well. If so, he must first have expelled its carbonic acid by means of a powerful heat, for there is no doubt whatever of its being a very pure carbonate of lime, and its association with granite and gneiss places it among the primary marbles. That gypsum has ever been found among primary rocks, so as to indicate its primary origin, is doubted by some geologists. It bears a strong resemblance to alabaster, and probably on that account was mistaken for gypsum. On the subject of this mistake the following extract of a letter, addressed by us to the Editor of the Quebec Mercury, is given;—

"Two kinds of alabaster only are known,—that formed on the floors of caverns by calcareous depositions from the roof, called stalagmites, and some varieties of gypsum or sulphate of lime. The former it cannot be, and one of the latter it is not for the following reasons:—All the varieties of gypsum except the anhydrous may be scratched by the nail, which this cannot be. None of them effervesce in acid, which this not only does but forms a clear solution in: The gypsums fall to powder

(‡) A remarkable instance of exaggeration if he alluded only to the bed in question; but it is probable that, deceived by the whitened surfaces of almost all the rocks in this place, he mistook that for marble which was only the rock it was associated with. M

der with heat—the mineral in question burns to lime. It is therefore a carbonate and not a sulphate of lime.

The translucency of this marble is remarkable, which joined to its colour (in favourable specimens a dazzling white, sometimes slightly shaded with pink) renders it, to all external appearance, well calculated for ornamental purposes, particularly for the manufacture of vases, lamps, &c.. If its abundance will allow of its being employed as a building stone, the ease with which it may be worked, its solidity and whiteness, would render it at once an economical, a durable and a handsome building material. Some have indulged the hope that it might be made an article of export; but admitting that it is in sufficient abundance, which we doubt, white marbles of a far superior character are found in many parts of Scotland, a full account of which may be found in some papers communicated by Dr. Macculloch to the Geological Society of London, and entered in the 2nd and 3rd Vols. of its Transactions. We here insert an extract from one of these papers which will be found to afford some interesting information respecting the Grecian, Italian and Scottish marbles,

"Few substances in the catalogue of those with which economical mineralogy is concerned, have excited more interest than statuary marble, from its rarity, its beauty and its indispensable necessity in the art of sculpture. It has at different times formed an object of anxious research in this country, and premiums have been held out for it by the Society of Arts. It has consequently been found in various parts of Scotland, as well as in Ireland, but no native specimens have yet been introduced into the arts. As the causes which have impeded their introduction have hitherto been such as may be considered adventitious being of a commercial nature, and not founded on any experience of their physical defects, it has been hoped that they might by perseverance and time be removed, and that the statuary marbles of this country might at some future day supersede

sede the necessity of importing this article. It will not therefore be a misplaced enquiry to examine the several properties of those marbles which have at different times held a place in the estimation of artists, and to compare them with our own specimens, more particularly with that of Sky, now under review, the most abundant and certainly the most specious of all those which have yet been found in Britain. The enquiry is the more necessary, as the several circumstances in which white marbles differ, do not appear to have been generally attended to, and as an undue value seems in some instances to have been fixed on our own in popular estimation, although not in that of sculptors themselves.

"The value of this substance in those distant periods when the arts of Greece flourished, occasioned an industrious research after a material in which the sublime ideas of its artists could be embodied. Accordingly many quarries have been wrought in ancient times, of which little has descended to us but the names, and a few of the works which were executed from their produce. These marbles were of various qualities, and examples of them are still to be seen in ancient statues, although with regard to many of them a species of evidence often little better than conjectural, has guided sculptors and mineralogists in their attempts to determine the quarries from whence they were derived. Among these, the quarries of Paros afforded a marble, (the often quoted lychnites of Pliny) in which it is asserted that the celebrated Venus was wrought, as well as some others to which we have not access. But there are many specimens of sculpture in the British Museum which seem to have been executed in this stone or one at least of analogous character.

"Of the nature of the Parian Marble we are enabled to speak positively, since some blocks of it have been quarried during the last few years, and are now to be found in the shops of the sculptors of this city. The grain of this marble is large

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and glistening, while at the same time its texture is loose and soft, and its colour of a yellowish and watery white. It possesses considerable translucency on the edges, a quality which, however desirable in statuary marble when of a fine grain, from the softness which it gives to the outline, only increases the disagreeable aspect of the Parian by the angular reflections of light which takes place on the pellucid edge and surface from the innumerable faces of the small plates. It is certain indeed that the Greek sculptors abandoned the marble of Paros after the quarries of Luna and Carrara were discovered, the superior fineness and whiteness of these marbles, which at present cause them to excel any with the places of which we are now acquainted, rendering them also at least equal to the best of those ancient ones of which the native places are now unknown.

"Independently of the injurious effects which the large grain of the Parian marble produces on the transparent surface of sculptured works, and the false lights which it thus introduces into the contour, it interferes materially with the requisite correctness of drawing in the lesser works, and is thus inapplicable to the details of small sculptures in relief. It is, nevertheless, susceptible of a good polish, a quality, however, of little value in the eyes of the statuary, and one which in this variety only serves to render the defects of its texture more apparent. It is also said to have been deficient in size, since it was so intersected by fissures as to be incapable of yielding blocks of more than five feet in length. I may add that, in the present state of the public habits with regard to white marbles, there is no demand for modern works executed in Parian marble. Its celebrity is consigned to the metaphors of poets.

"The quarries of Luna produce a compact white marble, susceptible of a high polish, and capable of being wrought with the most minute accuracy. Hence it is preferable for the

the finer operations of bas relief either to the Parian, of which the aspect interferes with the delicacy of finish and of surface required in these works, or to the Pentelic, which was subject to accidents from veins of mica and of serpentine; or to that of Carrara, in which dark veins are of frequent occurrence. It was accordingly preferred by the ancients, and among many other works, the Apollo (Belvidere) is said to have been executed in Luna marble. We have no other knowledge of the marbles of Hymettus and of Arabia than their names.

"Of all the marbles employed in the works of the ancients, and of which many specimens have descended to our days, that of Carrara is almost the only one which is at present held in estimation, or is now accessible to modern sculptors. This marble is of a very fine grain and compact texture; it is also susceptible of a high polish when required, and is consequently applicable to every species of sculpture, except when, as is too often the case, dark veins intrude and spoil the beauty of the work. Notwithstanding the general apparent uniformity of its texture, it offers different varieties of aspect. It is always of a fine granular fracture, yet this fracture is sometimes combined with a slight tendency to the flat splintery, in which case the stone is harder and more translucent than when it is purely granular. When merely granular, it is sometimes dry and crumbly, precisely as if it had been exposed to a high heat; it then loses much of its transparency, and is called woolly by sculptors. Its transparency is various, and in some cases nearly equal to that of alabaster, (granular gypsum.)

"The last of the ancient marbles which I shall describe, is that of Pentelicus of which the quarries are probably still to be found in the vicinity of Athens, although they have not been investigated by modern travellers. This marble is of a loose texture, and moderate sized grain, coarser than that of Carrara but finer than that of Paros; in colour it is ex-

exceedingly imperfect, being tinged with grey, brown and yellow, and mottled with transparent parts, which give it the appearance of having been stained with oil. But its most formidable defect is its laminated structure, and the quantity of mica with which it is contaminated; to this we are to attribute the corrosion and almost entire ruin of so many of the specimens, the action of the weather desolving those parts of the stone where the mica is most abundant, and cutting deep fissures through many parts of the work. It is peculiarly unfortunate, that the two most admirable specimens which are calculated to excite in the minds of artists a mixed feeling of wonder and despair, the horse's head, and the Theseus, should be those which have suffered most. Had they been fortunately executed in the more uniform and durable stone of Carrara, these works might still have been preserved to us in all there original perfection of drawing and surface. Even the hammer of the Turk would have rebounded with little injury from the marbles of this texture, while the micaceous stone of Pentelicus, splitting in the direction of its laminæ, has permitted the complete mutilation of many valuable sculptures.

"We have no geological information with regard to the relation of these stones. The great resemblance of the Pentelic to that of Glen Tilt, in aspect and composition, renders it probable, that like this, it lies in mica slate, forming beds parallel to, and interstratified with, that rock: that the others have similar relations to the primary rocks, we should have concluded on general geological principles, had we not already seen that the white marble of Sky, which has given rise to this discussion, belongs to the secondary strata.

"We have now to examine the white marbles which have been discovered in our own islands, for the purpose of comparing their relative properties, and the value which they are likely to possess in sculpture. I am unfortunately unable to give any

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account of those found in Ireland, neither having seen their places, nor being possessed of any specimens.

"That which has been found at Cape Wrath, in Scotland, is of a grain much larger than even the Parian, and is consequently useless for the purpose of sculpture; and this indeed is by much the most common character of the Scottish specimens. Those of Blairgowrie, of Glenavon and of Balahulish, are all equally characterized by this large sparry texture, and are all equally unfit for sculpture, however applicable to the purposes of architecture. The marble of Iona has been long since exhausted, and consequently requires no particular notice: however, valuable from the purity of its colour and compactness of its texture, yet the uncertainty of its splintery fracture before the chisel, (that tool without which no spirited work was ever finished) combined with its great hardness, would probably have rendered it useless in the arts even if it were still to be procured.

"In a paper on Assynt, I have already described the white marble of that district; it is of a very close texture, and although it contains no earth but lime, is of unusual specific gravity and hardness. It is incapable of being polished, a circumstance, it is true, of no consequence in Statuary, since the polish only gives a false light to the surface, and is not admitted of in modern sculpture; but it labours under the concomitant disadvantage of want of transparency, producing nearly the same dead effect and dry outline as is seen in a plaster cast, a fault in itself sufficient to prevent it from ever being adopted as a good material in the arts: its extreme hardness also renders it very expensive to work.

"The marble of Sky, the more immediate object of this discussion, is of a pure white colour, and appears sufficiently extensive and continuous to be capable of yielding large blocks. The purity of its colour is seldom contaminated, its fracture is

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granular and splintery, and its texture fine, less fine than that of Iona, but more so than that of Assynt; its compactness, hardness and gravity are greater than those of the marble of Carrara, which it in fact resembles in little else than colour. It is apparently well fitted for all the purposes of sculpture as it can be wrought in any direction, and has sufficient transparency, while at the same time it assumes even a better polish than is required for statuary. With these good qualities, however, is combined an uncertainty arising from its unequal hardness. While some parts of the stone are nearly as easy to work as that of Carrara, many other specimens turn out so hard as to add a charge of near 50 per cent to the cost of working: this appears to arise from the influence of the syenitic and trap veins which traverse it, as I have before mentioned, but which, however, produce no change in its chemical composition, nor any other effect than that of induration. This addition of price to the current charge of working is sufficient in the harder specimens to counterbalance in a great degree the superior cheapness of the material, and the advantages derived from lower freight, duty and insurance. Such are the difficulties which oppose the introduction of the most perfect marble which has yet been found in Britain, difficulties which, slight as they are, ought, together with the prevalence of established habits, and of a commercial routine, to check the extravagant hopes which have been entertained in this country, of superseding by its own produce, the importation of foreign statuary marble. But it will not be rendering justice to the marble of Sky if I do not add, that it possesses a property not found in that of Carrara and one of considerable importance, at least in small sculptures This is, that compactness of texture by which it resists the bruise which so often takes place in marble, at the point where the chisel stops, an effect known to sculptors, by the techni-

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cal term *stunning*, and of which the result is a disagreeable opaque white mark, generally in the very place where the deepest shade is wanted."

It is hoped that the foregoing digression will be excused, as it affords information not generally before the public, by which the means of estimating the white marbles of Canada are readily obtained; as well those whose localities are already ascertained as others that will eventually be so.

The rocks on both sides of the Saguenay, as high up as La Buole, (a mountain which stretches out into the river from the north eastern side, in a remarkable manner) are probably granitic, and form a continuation of the same series met with in the more immediate neighbourhood of Tadousac. They have sometimes the appearance of being stratified and of dipping to the S. E. at an angle which is nearly vertical. These rocks rise with almost perpendicular scarps to a considerable height, and their summits are barren, and in some places totally bare, in which latter case, the whitened surface of the rock, owing to the incipient decomposition of its felspar, resembles that of some limestones; they are often also of a smoked or blackened appearance: nearly *à fleur d'eau*, a red ferruginous band characterises these rocks: Their outline is rounded and mamillary, a character they lose as the river is ascended.

It was in the La Boule that we observed for the first time those singular masses of trap, sometimes under the form of veins or dykes, sometimes under the form of interfering and unconformable beds or strata, but most frequently as isolated patches both rounded and angular, the whole so deserving the attention of the geologist. As these trap appearances are characteristic of almost all the rocks we saw, it is necessary to describe the mineral contents of that aggregate to which we have applied this term, particularly as without such a description it is almost unintelligible, owing to the loose and indefinite manner in

 which

which it has been used. This term, wherever it may appear in this essay, is meant to imply any rock in which hornblende predominates, without any regard or reference to those theoretical notions which it has been often used to convey. It here more particularly means an aggregate composed of black crystalline hornblende, small grey crystals (or rather scales composed of an assemblage of crystals) of felspar and a little unelastic mica or talc: in short, a substance similar to what has been before described as associated with the white marble at Moulin a Baude, but essentially differing from it in the manner in which it occurs. It much resembles also a compound that is found on the Montreal Mountain, to which a volcanic origin has been ascribed. The granite with the trap here associated was of a greyish color. In it we in one place observed nodules of magnetic iron, exhibiting a very iridescent surface resembling some ores of copper, for one of which it was at first mistaken. This ore is very strongly magnetic, apparently as much so as maleable iron. Contrary to the hornblendic compound in the gneiss at Moulin a Baude, it is not easy to procure a fragment of this trap shewing the two rocks in contact, as upon being struck they separate immediately and it is then perceived that the trap has externally that smooth even surface which a mould bestows on the substance cast in it, shewing generally no appearance of entanglement or conglomeration at the places of contact. On the weathered surface of the trap the felspar is often brown and prominent. This trap is often very magnetic.

The granite of La Boule, for such we call the rock though apparently stratified, is composed of grey quartz, reddish felspar and small points of brown mica. A little above the line of junction of the river and the rock and on its south-eastern side, a thick dyke of trap traverses it nearly horizontally and at right angles to the stratification. It appears to rise out of the water at the western extremity of La Boule,

and

and, with a slight inclination, ascends towards the eastern.

We will now describe more particularly the appearances of these dykes, veins, &c.: they rise at all angles through the accompanying strata; they are frequently parallel to each other, and even to the planes of stratification; they generally either terminate suddenly in the rock at one or both extremities; in the latter case they answer the description of contemporaneous veins; these extremities are either pointed or forked.

The accompanying diagram (plate 6, fig. 1,) will afford a better idea of what it is intended to describe.

Isolated quarter moonshaped pieces and patches, varying from the size of the hand to that of the body are more common. (plate 6, fig. 2.)

It is worthy of observation that the small quarter-crescent shaped pieces occur together by twos and threes in a parallel order, and that the trap, of whatever shape, generally has angular corners, and terminations. Channels and hollows are sometimes seen in the face of the rock, which are owing to the removal of the trap formerly occupying these vacancies.

It is not, however, merely as veins, beds, and distinct concretions that this trap is observed; it occurs, particularly in the higher parts of the Saguenay, in mountain masses bearing little appearance of stratification; sometimes in masses in which its stratification will scarcely admit of a doubt, and sometimes it is rendered so evident by alternating with other stratified rocks, that no uncertainty can exist on the subject.

The La Boule, by projecting so much into the river, occasions, when the tide is falling, a strong current and counter eddy. Not being able to surmount this current, the boat dropped into the eddy, and running along the base of the mountain on its south-eastern side, turned into a small cove, where the height of La Boule was found by an observation to exceed two hundred

hundred feet, but by how much could not be ascertained in consequence of the contracted nature of the ground we were upon. The rocks on the northeastern side of the Saguenay, in the bay below La Boule, appeared to have a stratification directed east and west, with a high dip to the north, but this geognostical feature here was, as it was found to be in many places elsewhere, often of a doubtful character, owing to the contradictory appearances which some of the supposed planes of stratification assumed, and which to reconcile would have demanded more time in their investigation than could be afforded. In recording the stratification of those places where these contradictory appearances were observed, care has been taken to give the predominating bearing only. The evidence which arises from consulting alternating strata is, in the Saguenay, often inadmissible, as the trap sometimes assumes an appearance of stratification which is probably fallacious.

While seated on an accumulation of boulders covering the shore of this bay, rocks of a remarkable sterility were seen on the opposite side of the river, associated with others of comparative fertility, the former possessing an appearance of stratification in which the latter were deficient. The known infertility and constant stratification of gneiss, renders it probable that it is here associated with trap, a rock generally unstratified and of a more fertile character. A question here occurs, Is gneiss more infertile than granite? and if so, why is it the case? the only difference between them being in the arrangement of the same minerals of which they are both composed. Is it that the foliated character of the gneiss renders that rock more easily disintegrated and reduced to a state of sand, by which the soil of a country where it predominates is impoverished? The fresh water procured in this bay was strongly impregnated by iron.

Availing ourselves of the tide to pass La Boule, we ascended the Saguenay. In Passepierre Bay, the rocks were observed on the

the north-eastern side of the river to have a bearing north and south, and at Baie St. Etienne a little higher up, on the south-western side, they were seen, contrary to their general habits, to retire from the shore and to leave a few acres of clay alluvium, on which wild grass is cut annually. Between Pointe St. Etienne and L'Ance aux Foins (another more extensive alluvial deposit higher up) the rocks are particularly worthy of observation for the numerous dykes and contorted veins of trap by which they are traversed. These rocks are stratified, and dip at a high angle to the south. In some places here the trap dykes, which exactly resemble those we have described in their mineral contents, structure, and generally intrusive or interfering character, have the appearance of alternating in strata with syenite. The opposite shore of the river offers the same appearances, but not having landed there nothing more can be said of them.

In the precipitous cliffs on the north-eastern shore of the Saguenay, in the direction of St. Marguerite's river, these dykes are very conspicuous, and from their blackness bear some resemblance to upright beds of coal. It is noticed here, as it is elsewhere, that where trap most abounds there is always a more dense growth of timber, and this character is sufficiently striking in many places on the shores of the river, as the syenite with which the trap is usually associated, affords often, by its extreme barrenness, a strong contrast. On one of the islands of St. Louis was observed a rock composed of quartz, felspar, and mica, a genuine granite in composition, but in evidently stratified masses, the bearing of which was north and south, with a high dip to the westward.

On ascending the river at Point Comfort Bay, the rocks were of syenite, in which a little quartz was perceptible; externally they had a greenish colour, owing it is believed to the presence of epidote which very wet weather had rendered more

distinct

distinct and lively than usual. These rocks possessed a very distict appearance of stratification to the north and north-east, and dipped to the east and south-east; other contradictory planes were however seen. Many of the rocks in this bay possess a porous exterior.

At nine o'clock of the 12th August the temperature in the shade was found to be 71° Far. and in salt or very brackish water 65°. With the conjectured distance of five hundred and fifty feet as a base, and nearly 45° as an elevation, a height of five hundred and thirty feet was obtained for a mountain on the north-eastern shore. On the opposite or south-western side the summit of a mountain, in a supposed base of two miles, subtended an angle with the horizon of 7° 27' 54" which gives thirteen hundred and sixty feet for its perpendicular height, a result as we think much too considerable, although the land appears to rise from the mouth of the Saguenay as high up as Baie la Trinité, where it is conceived to be highest. The precipitous and indented shores of this river afford few convenient situations for measuring a base upon, in order to insure, by a calculation from true *data*, the accuracy of this sort of information.

Having landed a little above la Baie des Cascades, a syenite, composed of reddish felspar and a black hornblende, was found, and a short distance beyond, the same rock, characterized by those remarkable imbedded pieces of trap, occurs; they have here either the form of a snake or of angular fragments of an irregular figure; contorted dykes of the same substance were also seen. The trap in this instance contained no mica; in other respects it was exactly similar to that before described. About this place the river was measured by Mr. Proulx, one of the Surveyors, and found to be about fifty chains. One of the specimens of syenite procured here, appeared to be principally composed of light brownish compact felspar; its fracture was flatly conchoidal in the large, but uneven and scaly in the small,

with

with a few small glimmering points, arising from the reflection of light from the polished surfaces of minute crystals of common felspar; however, upon submitting it to the blowpipe, it was found to be infusible, but the heat it had been exposed to disclosed its really granular structure, which induced us to suppose it to be an exceedingly intimate aggregate of quartz, felspar, and hornblende, the leading mineral in excess. This has been mentioned merely to hint at the difficulty which sometimes attends an examination into the mineral constituents of rocks.

Having again put on shore in a very convenient bay, opposite Baie la Trinité, syenitic rocks were met with, or mixtures of felspar, hornblende, and very rarely quartz; the felspar was white, grey, red, yellow and greenish; the hornblende always black. These rocks, as elsewhere on the shores of the Saguenay, were in some places much stained by iron, and Mr. Proulx collected a specimen on the north side of the river, in latitude, as he ascertained by observation, 48° 24', which was not only much discoloured, but the rock from whence it was taken affected the needle to the amount of 1°-30'. We could perceive magnetism very distinctly in the specimen in question, but it is a very common character here, and was found to exist in many of the specimens brought home, particularly in the trap and some of the syenites abounding in hornblende, to the presence of which mineral it could generally be traced. The rocks had here a dip to the south at a high angle. The fall of the tide was ascertained to be twenty-one feet.

We left the bay about eleven o'clock, p. m. to avail ourselves of the tide, and coasted along the north-eastern shore all night. In the morning of the 13th of August we landed in a bay on the left shore, called Ance aux Femmes, directly opposite to HaHa Bay. Here we found a rock containing more quartz than usual, and passing into a syenitic granite, the felspar in which is flesh-coloured. This rock was observed to have the

same

same porous exterior as before-mentioned, nor was this character of porosity confined to the surface, as a specimen brought from the place exhibits it both internally and externally in so perfect a manner as to afford an excellent sample of a millstone; its quantity cannot be stated, but the writer believes it to be abundant. It should be generally known that good millstones are often found among syenitic rocks.

Several rocks in front of the bottom of this bay, which by the rising of the tide are converted into islets, were examined. The first met with was syenitic gneiss, having a bearing nearly north and south, and dipping to the west at a high but variable angle. It sometimes loses its character of gneiss and maintains those only of syenite; the usual imbedded masses of trap are present under all the appearances before described, and one additional: some of the snake-shaped imbedded pieces were broken through the middle apparently, and the fragments separated from each other, like the well-known shifts in veins, but no corresponding fracture in the rock was seen. (pl. 6, fig. 3,)

Almost all the rocks examined in this place were of the same description, differing only in their dip which was sometimes reversed. It was here, however, that we observed for the first time regular and conformable strata of the same aggregate as that found imbedded in the syenite, and to which, from its interfering character in other places, we are unable to affix any other name than the general one of trap, using this term here as elsewhere, without the implication of any theory to designate certain aggregates in which hornblende predominates. Water-worn fragments of compact shell limestone were here seen, the color of which was grey and fracture flatly conchoidal and sharp-edged.

Leaving these rocks, others to the south-eastward in the same bay were visited; they bore a great general resemblance to the first

first in all their features; the trap was, however, seen here to interfere with the syenite in broad dykes, and the former was occasionally traversed by veins of felspar; these veins were observed in some instances to form a connecting link between the syenite above and the same rock below, so that it is not possible to say if they have been filled from above or beneath; (pl. 7 fig. 4,) These veins were frequently observed in other places.

The next rock to the last-mentioned was composed of flesh-coloured light brown quartz, and black points of mica, and in which no imbedded trap was seen. To this, trap, apparently stratified, succeeded, and then a syenitic rock holding imbedded large patches of trap, (pl. 7 fig. 5.)

Further to the south, a specimen of trap was procured from a wide dyke, the hornblende in which had a remarkably shining semi-metallic lustre; it contains no mica, and is not magnetic. Still further, an immense fragment of rock having fallen, one of its surfaces was observed to be covered with broad laminæ of a beautiful felspar of a very pearly lustre; a light green mineral, supposed to be the green carbonate of copper, was associated with it in small quantity. The latitude of Ance-aux-Femmes was made 48° 22' 26."

As observations for latitude were necessary to check our courses they were taken at noon whenever the weather would permit; at the commencement of the journey it was extremely unfavourable.

The predominating rock between Ance-aux-Femmes and Cap à l'Est, about six miles higher up the river, appears to be (for it was not touched) the same trap; but syenite was also seen as usual with imbedded patches of the former. Having crossed the Saguenay opposite to Cap à l'Est, we entered a small bay to which was given the name of Bear's Cove; here granite, gneiss and syenite were seen, but no trap. Coasting up

the river on the same side, it was seen frequently again under all the forms before-mentioned. Sometimes the trap, rising in black channeled precipices entirely bare of vegetation, exhibited appearances in which a very distant resemblance to architectural regularity might be traced. Sometimes a part of the rock having broken away from below, black escutcheon-shaped masses were left projecting and frightfully pendant over the fragile canoe paddling beneath near the base of the rock: the latter appearance, however, is more characteristic of the opposite shore. No columnar structure was seen, but in many other places in the Saguenay as well as here, the rocks had a tendency to break into prismatic or cuboidal fragments. We believe the trap is in this place associated with syenitic gneiss, with which or syenite it appears sometimes to alternate. On ascending still further, and within a few miles of Chicoutimi, a whitish looking rock was observed, apparently in horizontal strata; passing at some distance nothing more was ascertained respecting it. To this succeeds an alluvial deposite of a rich marly clay, which continues on the right bank as far as the Post. On the left bank of the river the rocks continue without interruption, and without any geognostical change, as was ascertained subsequently.

Before we leave the Saguenay a few more observations upon its rock formations, which were entered in our journal while descending the river on our way home, will be here introduced, together with some additional information which Mr. Proulx's politeness has placed at our disposal.

La Baie des Foins, situated on the left bank of the Saguenay, a little below the Post, is a natural meadow of several acres extent, laying at the base of the mountains which here retire for a short distance from the river. The soil is a clayey alluvium, and, as the name of the place indicates, wild hay grows upon it which is annually cut. At Long Point, a little below

below Rocky Point, specimens of syenite and syenitic gneiss were procured. Imbedded trap was again seen here.

Having encamped a little above Cap à l'Est, on the western side of the river, and somewhere near our former encampment at Bear's Cove, the rocks were again found to be syenitic, and traversed occasionally by veins of red felspar and quartz; sometimes the two were intermixed. Large dykes of trap occur here, and rounded water-worn fragments of limestone. In a bay, distinguished by four semi-isolated mountains, three of which are of a conical form and situated on the left shore a few miles below Cap à l'Est, the rocks were observed to be the same, and the patches of trap very distinct. The surface of the syenite was yellowish brown, and slightly porous, as if baked, and this appearance was observed in many places, both in the Saguenay and afterwards in the St. Lawrence. The three semi-isolated mountains above-mentioned are the more remarkable, because in general both sides of the Saguenay are characterized by a continuous chain of mountains whose longitudinal outline is only slightly undulated, while their precipitous sides are always towards the river, to which the chain is usually parallel.*

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* It will not fail to be observed, that this slightly undulated outline, which is characteristic of both sides of the Saguenay, is at variance with the general direction of the mountain chains in this country, and particularly with those in its neighbourhood. There is great reason to believe that at least one wide valley, running nearly parallel to the St. Lawrence, exists in rear of St. Paul's and Malbay. On ascending the Saguenay we saw no sections of vallies, nor any considerable breaks in its lofty and precipitous banks, until Ha-Ha Bay was reached. Upon referring to the accompanying map it will be perceived that this bay has a direction about parallel to the St. Lawrence; it is probably, therefore, the outlet on the Saguenay to the valley alluded to. The general course of the mountain chains in this country is, as, has been before observed, north-east and south-west, that is, the same as the valley of the St. Lawrence, The valley of the Saguenay is from the north of west, and nearly at right angles to it; it is therefore a cross valley. That the rocks on either side of this valley were once united there appears very little reason to doubt, but water must have had very little to do with separating them, at least in the first instance. From the slightly undulated character of the sectional outline of this valley, it would seem to have been once filled by a continuous chain which has been severed longitudinally by some violent catastrophe, the nature of which can only be surmised. It is probable, however, that an earthquake has effected this dis-

Between this place and Le Petit Saguenay, on the opposite shore, such a geognostical uniformity prevails as to render the collecting of specimens superfluous; indeed the same remark is so far applicable to the whole of the country we traversed, that a dozen well-chosen fragments of rock, with the necessary observations upon them, would convey to the geologist almost as much information as he would acquire by going over the same ground himself. Let it not for an instant be conceived, that our observations are believed to be the necessary ones; the writer knows them to be altogether insufficient to convey any thing more than a very general idea of the geognosy of the country.

In a small stream, a short distance below Le Petit Saguenay, the rocks were observed to be intersected in a remarkable manner by veins of quartz and felspar, sometimes alone, at others united together forming an aggregate. Frequently these veins were divided exactly in the centre by a seam of trap; they have the same bearing generally as the stratified rock they traverse, namely north-east and south west, but they are often much contorted without losing ultimately this character. The trap is seen alternating in thick strata also. The predominating rock here is syenitic gneiss. A deception arises sometimes from a source which is not suspected when attempting to distinguish, as is generally easy, by the external surface of rocks, between the trap and syenite; the syenitic rocks have usually a whitened exterior, but sometimes, though rarely, it is as black as that of the trap, in which case a fragment must be detached before the rock can be known. This sort of deception was experienced be-

junction; the nature of the rocks, the recorded proofs of the violence of earthquakes on the northern shore in former times, and above all their frequent occurrence at the present day, though no longer of an alarming character, are circumstances which favour this opinion. A great wave would not have acted longitudinally but transversely, or in the direction of least resistance. The insignificent streams which enter this noble river have had little effect in forming it, and the operation of tides and maritime currents, though more effectual, can have been only partial and secondary.

between this place and Le Petit Saguenay, and it should intimate the propriety of never-naming a rock in general, until at least its fractured surface has been seen; decided trap was however often met with in this interval, either in stratified masses, or intruding among other rocks.

In passing between the St. Louis Islands and the south shore, we were obliged to take refuge from the breakers, which threatened to swamp our canoe, by climbing up a projecting mass of greyish granite, on which the night was passed. The mica of this granite was replaced as usual by hornblende, it was therefore syenitic; the former mineral being in all the rocks of the Saguenay country we have seen, very rare and almost entirely confined to some specimens of the trap, in which it occurs in small quantity and minute scales, and this indeed appears to be rather talc than mica, as it is unelastic. We only remember to have seen very distinct scales of mica twice; in both cases they were isolated hexagonal crystals, and one of them occurred in a vein of graphic granite composed of beautiful large flesh-coloured crystals of felspar and large rounded, or rather oval shaped, nodules of quartz, traversing the last-mentioned rock. Our observations of the geognosy of the Saguenay river terminated here.

From an inspection of Mr. Proulx's notes, and an examination of the accompanying specimens, the following additional information has been obtained.

The rocks in the neighbourhood of Ha-Ha Bay are counterparts of those already described in the Saguenay, and the same were seen at Point au Fort, Cap à l'Ouest, Petite Pointe, Cap St. Charles, L'Ance François and Baie St. Jean. They are rocks in which felspar and hornblende are always present, in a greater or less proportion, forming syenites and syenitic traps, according as the former or the latter mineral predominates. No instance of the hornblende predominating was seen, except in the

the black aggregate that has been described, where it not only predominates but in which the felspar is very subordinate. In this aggregate the felspar is always grey and scaly, and bears a great resemblance to quartz, for which it might easily be mistaken, but its fusibility before the blow pipe into a white bleb-by glass is a sufficient distinction. As might be supposed, when in association with syenite, the trap usually exhibits a striking contrast as to colour, to which the weathered surface of the former rock answers as a sort of foil. No difficulty would be felt in assigning to this rock a place among the "hornblende schists" of Maculloch, were it not for its unstratified appearance in some places, and particularly for its intrusive and interfering character in others; the latter indeed seems to point out the "overlying class" of the same author as its proper position. When quartz enters, as it does rarely, among the constituents of syenite, either syenitic granite or syenitic gneiss is produced: it is the latter, when by the arrangement of its hornblende in parallel seams, that peculiar foliated structure which characterises gneiss is the result.

Neither from Mr. Proulx's nor our own observations are we able to state with certainty the prevailing dip of the strata on the shores of the Saguenay, but it lies between the east and the west round by the south. We have before alluded to the difficulty of always determining the stratification, a difficulty which is common to many stratified rocks, but particularly to the masses under consideration which, from their felspathose structure and association with trap dykes, often sufficiently continuous to resemble strata, present flat even surfaces, and other superficial and linear appearances, by which the hasty or inexperienced examiner may be frequently deceived.

Water-worn pieces of limestone, among the earliest of the secondary class, were noticed in Ha-Ha Bay, and a singular trough-shaped mass, composed almost entirely of a grey carbo-

nate

hate of lime, appears to have been taken from a trap rock situated in the first cove on entering the bay from the north; the length of the trough is about two inches and breadth three quarters of an inch; the sides are indurated, and of a dark brown ferruginous colour, bearing the aspect of having been in contact with trap. This trough is half filled with calcareous spar, the exterior of which is covered with a smooth yellowish silky film, as if water washed. Professor Cleaveland has the following passage, in his second volume of his System of Mineralogy and Geology, 2nd edit.:—" Real lava does without doubt sometimes resemble basalt, green stone and other trap rocks, but it may be considered as an universal fact that although calcareous spar is often found in green stone and basalt, it is never imbedded in those lavas which have actually flowed on the surface of the earth."*

Several soils collected by Mr. Proulx in different parts of the Saguenay, principally in the neighbourhood of Ha-Ha Bay, having been examined, were found to be as is shewn by the following table:—

No. 1.	Ha-Ha Bay	A mixture of clay sand and lime, (marly clay)	Excellent.
2.	Ditto	ditto	ditto.
3.	Ditto	ditto	ditto.
4.	Ditto	ditto (without lime)	Good.
5.	Ditto	ditto ditto	ditto.
6.	Near Riviere l'Ilet	ditto and lime	Excellent.
7.	Between Rivers Chicoutimi & Dumoulin	ditto (without lime)	Good.
8.	Ditto	ditto	ditto.
9.	Ditto	ditto, with vegetable matter	ditto.
10.	Ditto	ditto, sand, clay and iron	Bad.

* By the latter part of this sentence, which is somewhat obscure, we understand those lavas which have been ascertained positively to have flowed, because many geologists assume an igneous origin for all or most of the trap rocks.

11. Place not mentioned.	ditto	Light but tolerably good.
12. Ditto	ditto, clay and sand (loam)	Good.
13. Ditto	ditto, sand, iron, a little clay and vegetable matter	Indifferent.
14. Ditto	ditto, clay and sand (loam)	Good.
15. Ditto	ditto ditto	ditto.
16. Ditto	ditto ditto	ditto.
17. Ditto	ditto ditto	ditto.

The rocks at the Post of Chicoutimi, like most of those we have described, are syenitic; the chapel stands upon a syenitic granite, passing sometimes into syenitic gneiss; this rock is traversed in a remarkable manner by veins of felspar and trap. The trap, however, is generally seen in broad bands forking into the adjoining rock, which is either syenitic granite, or syenite having its felspar greatly in excess. Weather acts more readily upon the trap than upon the granite, and in consequence many of the veins or dykes are partially empty near the surface. The same was observed in other places. To this cause are probably owing the numerous bays in the Saguenay, as trap rocks were more generally found where they occur, while syenitic granite and syenitic gneiss occupy its capes and headlands.† A few imbedded nodules of magnetic iron were observed in the rock. Sometimes the quartz is absent when it loses the term of granite, and maintains that alone of syenite, in which the felspar is red and the hornblende greenish black. There is on the shore below the residence at the Post a curiously contorted vein of trap which descends the rocky bank, as represented in plate 7, fig. 6.

Detached pieces of felspar of a very crystalline aspect and of a dark purplish grey colour were frequently seen upon the shore; the

† To this cause also may be attributed the unusual fact, that almost the narrowest portion of the Saguenay is at its entrance, where the rocks are more sileceous and less amphibolic.

the faces of the laminæ possessed a highly polished vitreous and striated surface. They have much resemblance to a felspar rock subsequently found to occupy a large proportion of the shore of Lake St. John, as also to specimens of felspar brought from the coast of Labrador, where they were observed to be associated with columnar and amorphous basalt. One fragment of a silecious limestone was also found. It appears that about twenty years ago lime was made at the Post, and the site of the kiln is shewn where specimens of a half-burnt limestone appeared. It is a very good compact shell limestone of a grey colour. Some of the burnt pieces were white, had a splintery fracture, and resembled chert or hornstone. If there be a natural deposite of limestone in the neighbourhood it could neither be heard of nor found; that in question might have been brought for the occasion from Malbay or St. Paul's Bay where limestone abounds.

It has been before mentioned, that a considerable alluvial deposite occurs here. It consists of fine marly clay, which in wet weather is so considerably plastic and adhesive, as to be traversed with difficulty on foot, when covered by no vegetable deposite. Its essential characters are the following: colour, light french gray—structure, earthy compact—fracture uneven. In water it falls to pieces rapidly and in acid it effervesces slightly. The undermost beds which are not exposed to moisture, assume the appearance of rocks stratified horizontally, and it is probably this formation which we observed, when within a few miles of the Post.

Upon crossing the Saguenay, opposite the Post, syenite and a rock composed of an intimate mixture of hornblende and felspar, the former in excess, were seen; the latter contained a few scales of mica and points of quartz: it was compact, magnetic, and more resembled basalt than any rock we had previously seen. The syenite was composed of flesh coloured felspar and

green hornblende. A few imbedded patches of trap were also seen. From the falls of Chicoutimi, a light coloured syenite was brought, composed of light red felspar and black shining crystals of hornblende. Mr. Nixon returned from a stroll up the river, on its right bank, with specimens of trap, traversed by veins of felspar, and a gneiss, in which hornblende was more abundant than either the quartz or the felspar, and to which the term hornblendic gneiss may be affixed: an aggregate of this description was rarely met with. The mean of two observations for latitude, gave 48. 24'. 9".

Leaving the Post of Chicoutimi, and its polite and gentlemanly resident, Mr. Andrews, on our route to lake St. John, a portage of nearly a league in length, was made to the Chicoutimi river, over the same syenitic rocks as those seen near the chapel, which are covered with a thin layer of the marly clay of the neighbourhood, surmounted by the usual vegetable deposite; a good soil, but too near the rock to be very productive. The same soil, to appearance, and always accompanied by the same rock, at a greater or less depth, continues as far as the portage de l'Enfant, after which it becomes sandy and indifferent: some good positions for settlement may be expected in this interval. Although the rocks in many places are known to be near the surface, they were seldom seen, the land on either side the Chicoutimi river thus far being very little elevated. At the portage de l'Islet, however, they are much exposed to view, and consist of syenite, in which the felspar is as before flesh coloured, and very predominating. This rock has very little soil upon it, and the whole of the portage is a barren waste. Before reaching the portage de l'Islet, the banks begin to assume a more elevated character and they continue to increase in height as far as lake Kenwangomi, on the southern shores of which lake, and that of Kenwangomichiche, they have attained an extreme height of from three hundred to four hundred feet. The next

portage

portage to that of l'Islet is still more rocky, and on that account has obtained the name of portage des Roches: On a rounded mass of syenite in the middle of this portage, an observation for latitude was taken, which gave 48. 14. 31.

At the north western extremity of the portage des Roches, lake Kenwangomi commences. No opportunity occurred of examining any of the rocks upon this lake until we had advanced about two miles beyond Sandy Point, when a projecting point of rock afforded more specimens of syenite. A short distance beyond, a fine grained aggregate was met with, composed of gray quartz and gray felspar, slightly freckled by hornblende, of a greenish colour, the felspar being distinguished from the quartz, by the brilliant reflection of light from the polished faces of its minute crystals. Further on rocks were met with in which felspar of a flesh-red, dark grey and greenish colour was in great excess; hornblende was also present, but in a very subordinate degree, chiefly in patches. The felspar was here in beautiful distinct crystals projecting from the rock, under its usual rhomboidal form; these were easily detached, and their laminar structure readily exhibited by the slightest percussion. Magnetic iron was found in some parts of the rock, which strongly affected the compass: much of the hornblende was also magnetic. In one of the rocks here, a mineral was found, which possessed the following characters: colour, a dark greenish brown—opaque—structure indistinctly laminar before the application of heat; occasionally the laminar structure is more distinct, and it then resembles mica.—When pounded in the mortar, small (foursided?) scales are seen, having a semimetallic lustre. In its aggregated state, its lustre is glimmering and semi-metallic. It is slightly magnetic before the application of heat; when exposed to that of a candle, it expands, opens like a fan and exfoliates, after which it is easily pressed by the fingers into small flexible but unelastic

scales

scales of a bright golden colour. The same thing occurred, by submitting it to the exterior flame of the blowpipe, in which it also decrepitates and is difficult to be retained in the forceps. One of the golden coloured scales in the interior flame of the blowpipe fused into a shining black and highly magnetic globule. With borax it forms a transparent glass coloured by iron. The color subsides on cooling.

The rocks in this place have little appearance of stratification; judging from the little which does appear, the bearing is north and south, and dip nearly vertical. The latitude was here found to be 48°-16' 22" and the approximate variation of the compass was also taken at the same time, viz: sixteen and a half degrees. Being very near the rocks at the time of the observation it was suspected that their magnetic character might affect it, but upon reversing the sights of the instrument upon the same right line, the slightest difference only was observed, which might have arisen from a small degree of inaccuracy in the compass.

Beyond this place a mass of rocks of a very blackened and singular aspect was observed on the northern shore of the lake; and crossing over from the southern, a distance of about two thousand feet, we found these rocks to be almost entirely composed of yellow brown and greenish coloured felspar. In the solid scarp of one of these rocks, resembling that of a martello tower, it was easy, on a near approach, to perceive, notwithstanding its weathered surface, the pearly but subdued lustre of the felspar, and the fibrous aspect which the edges of the laminæ presented at the surface of the rock. The stratification of this rock in this place was not very apparent, but a little higher up on the same side it was observed to have a bearing to the north and dip at a high angle to the west.

The imbedded pieces of trap so common on the Saguenay, are again seen here. The land on both sides of Lake Kenwangomi

gomi is elevated, but much more on the southern than on the northern. Its course, upwards from Portage des Roches, is at first to the southward of west, but its main course is to the northward of that point. Its length, numerous rocky capes and bays, and its precipitous shores, cause it to resemble the Saguenay, but its mountains are neither so high nor so barren.

About four miles above Sandy Point, a name which has been given to a low bank of sandy alluvium, stretching out into the lake from the northern shore, there is a dry green bay which appears to enter deep into the north shore and to be free from mountains and rocky precipices for some distance. It is the only place we observed between Portage de l'Enfant and that of Kenwangomi, where land fit for farming might be expected to occur in any considerable quantity.

The portage Kenwangomi is generally supposed to separate the waters flowing into Lake St. John (and subsequently into the Saguenay through Lake Kenwangomishish, La Rivière des Aulnets and La Belle Rivière) from those which pass more directly through the Chicoutimi into the Saguenay; but it is said that this is not, strictly speaking, the case, because a small stream falls from Lake Kenwangomishish into Lake Kenwangomi. Although unusual, this is not a physical impossibility, without indeed, as has been asserted, the waters of the latter are higher than those of the former. This portage is about eighteen hundred paces in length, the first half of which is sandy and the other a mixture of sand and clay. On the latter ash was observed for the first time, and it was frequently seen with elm and other woods, which indicate a good soil (though never in abundance) in our descent from this place to Lake St. John.

Shortly after embarking on Lake Kenwangomishish we touched at an angle of a rocky islet and found an aggregate composed of felspar, quartz and hornblende, a syenitic granite.

nite. The course of this lake is generally to the north of west. Its shores are low, interspersed with elm and ash and fit for cultivation, particularly the northern side. On Lake Kenwangomi the prevailing timber was white birch, and neither ash nor elm was seen. Although the immediate shore of Lake Kenwangomishish on its southern side is low, on retiring back from it the lands become ultimately as elevated as those on the northern shore of Lake Kenwangomi, of which they are probably a continuation.

The river of Alders, the outlet from Lake Kenwangomishish, flows through an alluvium composed of layers and mixtures of sand and clay. The course of this river is exceedingly tortuous, a circumstance often characteristic of these alluvial deposites, and being narrow it is much obstructed by fallen trees, and the entanglement and intertwining of the branches of alder, with which both banks are covered, rendering portages sometimes necessary where there is plenty of water and little current. The portage des Aulnets, however, is occasioned by the river tumbling over the rocks, which re-appear in this place. They are composed of flesh-coloured felspar, green hornblende, and a few scales of black mica, forming a beautiful syenite. The felspar on the surface of the rock was, as is usual, observed to be in an incipient state of decomposition. The soil examined in crossing the portages in descending the river of Alders was tolerably good. It consists, beneath the usual layer of vegetable matter which characterizes these woodlands, of clay and sand mixed, or in alternate layers, the latter frequently in excess on the surface. In some places the land is hilly, but few rocks are seen. At the north-western extremity of the Portage of Alders, a natural section affording the opportunity, a more particular examination of the soil was made and registered as follows:—1st. Decayed and decaying vegetation; 2nd. A layer of sand one foot six inches in thickness; 3rd. Clay

Clay from ten to twenty feet in depth, the whole resting on a rock composed almost entirely of grey felspar, in which were observed patches of hornblende. At this place the river of Alders forks in with La Belle rivière, passing over a picturesque fall occasioned by the felspathic rock before mentioned; the former river is only indeed a branch of the latter, which is observed to widen immediately after this junction from an average breadth of twenty to that of fifty feet.

On descending La Belle Rivière, the land was found to improve considerably in appearance, the same alluvial soil continued, but forming flat and low shores, unaccompanied by hills. Indicative of this improvement, ash, elm and poplar became more common. While on this subject, it may be observed, that although the presence of timber of a certain description may indicate good soil, its absence does not necessarly imply the reverse; for on this excursion, we met with several places in which the soil was decidedly good, without finding it, and wherever found, it was always in subordinate quantity, On the marly shore of the Saguenay, in the neighbourhood of Chicoutimi, we saw none, and yet a better soil could scarcely be met with. To produce a growth of fine timber, something more is requisite than good soil; the land must be opened to warmth, light and air; it must be disencumbered of that heavy mass of decayed and decaying vegetation, with which our forest lands are loaded. If *apparently* under all these disadvantages, some lands produce good timber, it is only an exception, and no sufficient argument against what has been advanced, *particularly as such exceptions are probably owing to one or more of the favouring circumstances being in operation. It should also be remembered, that good soils have a tendency of themselves, by encouraging a rank and dense vegetation of weeds and underwood, to check the growth of fine timber.*

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To judge of the quality of land by the growth of timber upon it merely, is to be guided by the effect, and to lose sight entirely of the cause; a practice, the inconvenience of which, if generally adopted, would soon be felt in every department of science.

As the shores of lake St. John are approached, the soil gradually becomes sandy, until at Kouispigan, as the mouth of La Belle Rivière is called, it becomes one sheet of fine bright sand.

Leaving Kouispigan, we proceeded on lake St. John, to the northward, in the direction of La Grande Décharge, and touching at two small rocky islets on our way, collected specimens of a rock composed almost exclusively of a highly crystalline felspar, of a dark bluish grey colour, but in which a little hornblende was present. This rock was observed forming black isolated masses, both on the shore and in the water, on this side of the lake. Having encamped on one of these, at the entrance of La Grande Décharge, we had more leasure to consult the characters of this rock, which are as follows: it possesses no sign of stratification; its surface is remarkably black, particularly when moistened, and often almost semi-metallic: it is frequently flat and tabular; many portions of it attract the needle, although the eye can detect no magnetic iron; its structure is compactly crystalline, in some cases passing into compact, but there are always to be seen some shining, often splendent faces of the laminæ, of which it is composed, and they are frequently striated. In many respects it bears a great resemblance to Labrador felspar, but its iridescence is wanting; it is occasionally traversed by veins of red felspar, and rarely small portions of its surface were covered with a brownish red powder, probably an oxide of iron. One of the veins traversing this rock, exhibited a curious phenomenon; the substance of the vein itself, composed of felspar and hornblende,

blende, was not magnetic—the sides of the vein composed of the felspathic rock we have described, were strongly so; and Mr. Hamel further ascertained, that the south side of the vein attracted the north pole of the compass, and the north side the south pole. To remove the chances of error, the experiment was repeatedly tried, with success, both by applying the compass to the sides of the vein, and detached fragments to the compass. The vein was about three inches thick, and had a N. W. bearing. When the compass was laid on the centre of the vein, the local attraction was observed in one place, to be equal to ninety degrees; in some parts of the same rock it was still more, even to a complete reversal of the needle: At a subsequent period, the place was again visited by Mr. Hamel in company with Mr. Nixon, and these observations confirmed. Upon our return home, the specimens which had been examined, were re-examined, and found to possess a feeble magnetism, but no polarity. The islet upon which the foregoing observations were made, forms one of a cluster at the mouth of la Grande Décharge, to which the name of Dalhousie was given; none of them appear to be more than twenty feet above the water.

On leaving this place a northerly course was again taken until reaching a fine sandy shore, we landed for the purpose of measuring a base preparatory to a survey of the lake about to be commenced by Mr. Hamel. These sandy shores are very characteristic of the lake, and add very much in our opinion to its beauty, though nothing to its fertility. Where no rock appears, fine shining yellow sand is substituted, and where they appear together, the former rises through the latter assuming that isolated appearance which has been mentioned. This sandy girdle is not confined to the margin of the lake, but passes a short distance into the interior, bestowing upon the land forming the borders of the lake, an infertility of aspect which vanishes upon passing these sandy limits. The greater portion

of this sand is yellowish white, but a dark reddish brown variety was often seen deposited upon it in continuous ripples at different but parallel levels. On examining this sand it was found to be composed principally of magnetic iron and precious garnet. It is an analagous compound to the emery of commerce, and if reduced to a greater degree of fineness, might be employed for the same purposes. The rocks here were found to be the same as at the last place; they have externally often the aspect of old lead, and when broken the faces of the laminæ possess a lustre which is at the same time almost splendent and semi-metallic. Upon commencing operations, Mr. Hamel found between twenty and thirty degrees of local attraction, but in one spot, free from it, he determined the magnetic variation to be 16°. 40' W. On these rocks *tripe de roche* is found in some abundance; it is of a deep copper brown colour, and agrees well with the drawings of it to be seen in the appendix to Franklin's quarto edition of his first Journey to the Artic Sea. When we first saw them they were mistaken for representations of some of the native copper ores which he met with among the copper mountains. To the taste it has the flavour of mushroom, and although meagre it is not unpalatable. The sandy beach here is enclosed by two rocky points, forming a bay about fifteen or sixteen hundred feet wide, the water in which shoals very gradually. A sand bank about fifteen feet high encloses this bay on the land side, beyond which there is a sandy swamp; and this is descriptive of much of the lake on this side.

On leaving this bay and proceeding again to the north, we doubled the rocky point, which was found to be composed of the same felspar before met with, as was also another we rounded soon after, situated at the entrance of an inlet up which we ascended mistaking it for the Koucouachime river, and where we found a very good soil consisting of a yellowish loam, about one foot six in thickness, resting on plastic clay. As the term loam

loam, like that of marl, is often used without conveying any very distinct idea of what is meant, either to the person who uses it or to the person to whom it is addressed, we will here explain, that wherever it has been used in this report, it has relation to mixtures of clay and sand (the former in excess) generally coloured by iron, but containing no lime; in short an earth of which bricks are made. To avoid misconception, however, the term has not been often introduced, Mere deposites of clay are often called marls, by which an erroneous idea of a country may be conveyed; it should not be forgotten that the presence of carbonate of lime is necessary to constitute a marl or marly clay, which is known by its effervescence in acid; such a soil is of the best quality, whereas clays are proportionably infertile as they approach to a state of purity.

Returning to the mouth of the inlet, our northerly course was resumed, and several hundred yards of a coast, composed of rocky points, jutting out into the lake, and enclosing fine sandy beaches between them, were examined. This, as has been before said, is the character of the lake here. The remarkable uniformity and simplicity of the rocks, hitherto met with, are worthy of notice. We could only make the following observations which differ from what has been described—viz: kidneys of the rock, coated with the brownish red powder we have before mentioned, were seen imbedded in the rock itself; they were at first mistaken for pieces of magnetic iron—and a bed or broad vein of compact felspar, of a light yellowish green colour, was seen traversing the rock, contrasting strongly with its dark associate. It differed from those minerals which it most resembles, by yielding to the knife and fusing before the blowpipe, into a white blebby glass, like the rest of the felspars. The surface which had been exposed to the atmosphere, was decomposed, carious and of a reddish or yellowish white colour. An observation for latitude was here taken, and gave 48°.-37.-59".

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On leaving the mouth of the Koucouathime river, which is situated about one mile to the north of the place of our last observation, a fine sandy shore marking the interval, our course was north west ward to the northernmost point of Koucouathime Bay, where the shores begin to be swampy; but sandy beaches were still occasionally observed, with partial deposits upon them of the same admixture of garnets and magnetic iron before mentioned. Putting on shore in one place we observed low parallel ridges of this sand several inches in width and depth, giving a character to the spot. Embarking again the same course was followed, and the shores became lower and more swampy as we advanced, indeed there appears to be very little difference of level between the lake and the land. In this portion of the former, and from one to two miles from the shore, you are surprised to find no more than three feet of water. This extreme shallowness is common to the lake (the depth of which in no part of it bears any proportion to its extent) and is the cause of the sea-like turbulence its surface asumes after the least wind, occasioning a violent ground swell and lofty breakers, to which, at a distance from the shore, the hardiest *vayageur* is frequently unwilling to expose himself. Upon placing the hand in the water on these occasions it felt very decidedly tepid. This shallowness and unusual temperature, by occasioning a more rapid evaporation, may account for a fact which it might otherwise be difficult to do, viz: six tolerably large rivers and several smaller ones fall into lake St. John, while only one of moderate dimensions runs out of it.

Continuing a northerly course the mouth of the Peribonea river was reached, where the latitude was found to be 48°-42′-37″, and this was the greatest that was made on the lake.

In about three hours after leaving the Peribonea river we reached a bay, at the bottom of which we encamped, and found

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a considerable deposite of a very fine admixture of clay, silex and lime (an excellent marl) underlying the sand. Finding deep water close to the shore, and a current setting from the northward out of an angle in the bay, it was conjectured that the river Mistassiny lay in that direction, which proved to be the case, and another observation of the sun's meridian altitude having been taken at its mouth, gave for latitude 48°-38′-55″.

Ascending the Mistassiny a short distance, the land though sandy appeared to improve, but neither here nor in any part of the lake, nor in the whole of the country we traversed was very good timber, remarkable for its abundance, perceived. Reasons have already been advanced for not considering the absence of fine timber as any proof of a bad soil.

On leaving the Mistassiny we proceeded to the Assuapmousoin on a southerly course. On crossing the mouth of this river we encountered a violent tempest; there was however no danger being near the shore and in shallow water. Upon the tempest abating we landed and encamped. Here we again fell in with rocks which had entirely deserted us since we left the bay to the southward of the Koucouathime river; they are of a different formation, and consist of clay-slate and fetid limestone in conformable strata. The clay-slate which was first met with is composed of an indurated schistose clay, exceedingly fissile, and assuming many of the characters of roofing slate. It occurs on the shores of the lake, and dips beneath its waters to the N. N. W. at an angle of 25°. The laminæ of the clay-slate are parallel to the planes of stratification, which is probably the cause of the extreme fissility of the rock in that direction; but perpendicular to these planes, or nearly so, are others which serve to perplex the examiner when wishing to ascertain the bearing of the stratification of this rock; however their want of continuosity and particularly the conformable position of the clay-slate with regard to the limestone, remove the difficulty.

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The surface of the rock is strewed with its weathered fragments, which exhibit no other change from the rock itself than that weather has rendered its fissile character more apparent; these fragments when slightly struck on their edges break into smooth rectangular slates. Solid slates five feet long, one foot wide, and one or two inches in thickness are seen; fragments of this description are very sonorous when struck.

After traversing this clay-slate for about one quarter of a mile, the fetid limestone before-mentioned was met with *underlying* the other conformable strata. Much of this limestone contains fossil organic remains, chiefly corallites and encrinites; productæ were also seen, and a singular fossil similar to a variety found in Drummond's Island, Lake Huron, of which there is a drawing in the sixth volume of the Geological Transactions, plate 30, fig. 5, from which that in question appears to differ chiefly by having the disks of which it is composed obliquely set on, whereas in the figure alluded to they have a rectangular position. That from lake St. John also tapers more than the other. The cross fracture exhibits a structure which is partly compact and partly laminar; the former appears to prevail towards the parietes, and to be composed of chalcedony or of a carbonate of lime passing into chalcedony; the latter occurs towards the centre, which is a calc-spar. Between the two there is also perceived a tendency to the formation of agate, chalcedonic rings and curves being distinctly visible. Sometimes the centre has nothing of the crystalline aspect whatever, but shews a rounded spot of a reddish-brown and opaque substance, apparently of the nature of the imbedding rock, which is a dull fetid limestone of a dark colour, and full of fossil remains. Close to the one here drawn, but at the back of the specimen, there is a producta. This character of becoming siliceous is common, but in a much greater degree, to the fossils from Drummond's Island, Lake Huron, with the species of which those found on

Lake

Lake St. John appear to correspond. The fossils however of the former are not only more siliceous, but the limestone itself in which they are embedded has been in some places metamorphosed into a chert or hornstone.

For the accompanying very accurate drawing of this fossil, (pl. 8,) we are indebted to Lieut. Ditmus, 66th Regt., ample justice to which has been done by the engraver, Mr. Smilie.

This limestone appeared to be separated from the clay-slate *above* it by a thin black shaley calcareous stratum, full of short undulations and rounded concavities occasioned by corresponding projections and spherical knobs in the limestone. These knobs or balls could sometimes be detached, and were found to be composed of a very compact dark grey limestone, having a glimmering lustre arising from the reflection of light from a few crystalline points, and a *water worn* aspect. In these no vestige of organic remains could be perceived, although a slightly fetid odour indicated their presence originally. The stratum of limestone in which they were imbedded appeared equally free from organic remains, but was of a more earthy texture. The thin black shaley stratum is itself a limestone, as its free effervescence in acid declares, but it appears to contain much clay and to be passing into clay-slate. The position of these balls we conceive is corroborative of the inferior level of the lime-stone with regard to its planes of stratification.

It is with much hesitation that we have ventured to state our opinion that secondary limestone here underlies clay-slate, because we know that such a position, if not altogether new, is at least of very rare occurrence. But as our province is to describe and not to theorize, we should have advanced still more improbable suppositions if, after the same unprejudiced researches there had been cause in our opinion to entertain them. The knowledge of natural history is very little likely to be extended if her votaries restrict themselves in their reports to what the exist-

existing knowledge on the subject may render probable. Having taken the trouble to examine, if an opinion be advanced (with humility proportioned to the degree of information) which is strongly opposed to experience, no censure is justly due though it prove erroneous. Some beautiful specimens of encrinal marble of a fawn colour are found here which would polish well and prove highly ornamental.

The limestone continued in visible strata for above one hundred and fifty feet, after which it appeared only in angular fragments for about a mile and a half further, when it again was seen in regular strata, forming a projecting point in the lake, the intermediate portion of the shore being characterized by a numerous collection of boulders consisting of granite, trap, mica-slate and angular fragments of clay-slate. Having seen no mica-slate before while in the Sagnenay country, we may have mistaken trap for it, the pseudo-metallic lustre of which, as we have before said, causing it often to resemble that rock. Two or three semi-rounded masses of the felspathic rock near La Grande Discharge were also seen.

The stratification at the above-mentioned point is obscure, but it appears to dip gently to the east. Much of the limestone had a very conglomerated aspect, or at least it appeared to be made up in a confused manner of pieces of itself, though no distinct imbedded fragments were seen. It contains imperfect fossil remains of corallines and orthocera.

Proceeding beyond this point the shore became gradually crowded to excess with fragments of various rocks principally of limestone. Rocks under the form of boulders were also very common, and as before, angular pieces of clay-slate. The number of these boulders, generally about the size of the head, rendered our walk over them painful in the extreme, the beef-skin mocassin being by no means a sufficient protection in these cases to the foot unaccustomed to wear it.

Embar-

Embarking and crossing over to a cliff about thirty feet in height, called Pointe Blue, it was found to be composed of the same fetid lime-stone in distinct horizontal strata. Organic remains are found in this rock, but they are generally indistinct. Embarking again for the south-eastward, the limestone was observed to continue on the shore, and at another point resembling Pointe Blue it forms a similar precipice on the lake. A little beyond this we put on shore, and found the same limestone forming a low beach. A cedar was measured here the girth of which was twelve feet, it was, however, by no means characteristic of the place, although the soil appeared to be much improved since meeting with the lime-stone and clay-slate, a circumstance that was to be expected. At the bottom of a bay beyond this place the same horizontal lime-stone forms the shores and bed of the Little or Ouitchouanitch river which, as a rapid here falls into Lake St. John.

Running once more to the south-eastward we encamped on a bare limestone point opposite L'Isle des Couleuvres. Some of the *voyageurs* had the greatest disinclination to visit this island on account of the number of snakes which were reported to exist there, and many wonderful stories of their forming festoons, knots, and lying together like a string of sausages, were told; but after traversing the whole island one shrivelled skin only was seen. Pears too (probably under the guardianship of the snakes) were said to be abundant with equal foundation. The shores to the northwestward were abundantly strewn with many fragments of corallites, among which we recognized caryophilliæ, chain coral, madrepores, retepores, millepores, and particularly that corallite so much resembling a bee's hive, and called favosite. The varieties of caryophilliæ resembled those to be seen in the sixth volume of the Geological Transactions. Some of the madrepores might easily be mistaken for the fossil eye-teeth of some animals, but their internal radiated structure

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distinguishes them. (turbinoliæ ?*) All these fossils have been probably washed up from the bottom of the lake, the island being apparently a mere sand bank. There is another island near it which, judging from description, is probably composed of clay-slate.

On leaving the former island we stretched across to the main, and entering a bay reached the mouth of the Ouitchouan, where another deposite of clay-slate was noticed. This slate differs from the other in the following particulars:—the strata are horizontal or nearly so—it is not observed to be here associated with any other rock—its weathered surface is white, whereas that of the other is black.—it effervesces in acid very slightly, and contains slight traces of organic remains, neither of which characters was observed in the other—it is in greater abundance and more easily quarried.

A person unacquainted with the deceptive appearances which rocks sometimes assume, would without hesitation pronounce this rock to be horizontally stratified, and in our judgment he would be correct; but there are other surfaces which have a parallel arrangement among themselves, and which might easily be mistaken for planes of stratification, particularly as their position is vertical and one which agrees better with the high dip the clay-slates so generally exhibit. However upon a closer examination of these planes they are found to suffer constant interruption and not to be continuous. The horizontality of the strata being here assumed as the fact, of which we entertain no doubt, the laminæ of the clay-slate are as before parallel to the surfaces of stratification. This rock is divided often, owing to

* We have seen specimens from Drummond's Island, Lake Huron, the structure of which is nearly as compact as ivory, owing to the infiltration of siliceous particles into the original interstices of the coral. This, together with their yellowish white fractured surface, render the denticular resemblance still more striking.

to these counterseams, into cuboidal masses and longitudinal frustra of pyramids, the latter sometimes resembling the blade of a stiletto. Whether you strike the rock on the edges of its laminæ or across the surface, a fracture in the direction of these laminæ is effected, accompanied of course in the latter case by the cross fracture. Above and in immediate contact with the clay-slate, is a remarkably fine bed of compact marly clay, to which cause the slight effervescence of the former is probably owing. Fragments of clay-slate are abundant on the shore in this place, and those of any other rock are rare. The latitude of the Ouitchouan river at its mouth was determined to be 48o–243-'5''.

Between the Ouitchouan and the Post of Metabitchouan we observed the same formation to continue for a considerable distance, beyond which we again came upon the limestone, possessing the same characters as before, but dipping to the northward at an angle of 45o. This appears to be a further corroboration of our opinion, and to infer the additional conjecture that the two rocks alternate with each other, otherwise the limestone must suffer a violent contortion to appear in the interval, between the two deposites of clay-slate, in horizontal strata at nearly the same water level, as has been described.

This alternation with fetid limestone suits the habits of the shales far better than those of the clay-slates to which they sometimes bear a striking, and to the eye an indistinguishable, resemblance, a fact which is remarkably exemplified in the present instance if this rock should prove to be a shale, which, after consulting its mineralogical characters, we are strongly of opinion it is not, although it cannot be concealed that the case appears a doubtful one. That the reader may be better able to form his own opinion on this point we here introduce those characters :—Colour, brownish black—opaque—structure really schistose, but apparently compact—cross fracture, uneven, some-

somewhat conchoidal—hardness about the same as clay-slate—color of powder and streak, reddish-odour slightly bituminous when struck—specific gravity 2. 4. In water its surface is covered with minute bubbles, *but it neither falls to pieces in it nor derives additional weight even after a long immersion.* A specimen from the last-mentioned place effervesces very slightly in acid, a character which is supposed to be owing to the proximity of the marly clay. Before the blowpipe it fuses readily into a globule of glass, having a dirty green or brown colour. Experiments alone can determine whether this rock is calculated to answer the purpose of a roofing slate; this must depend upon its possessing a requisite degree of fissility, and upon its power of resisting the action of the atmosphere: our opinion upon both these points is favourable, but it is only derived from a hasty view of the quarry. With regard to our geological dilemma, without wasting more time in the attempt to reconcile apparent contradictions, which a more intimate acquaintance with the *locale* would probably clear away, we will continue to relate facts. The limestone at the last-mentioned place forms a bluff precipice on the shore of the lake, and contains corallites, encrinites and productæ. The encrinites were as before in a fawn-coloured variety, well calculated for an ornamental marble; some of it has the conglomerated aspect before described.

Pursuing our route, we reached the post of Metabetshuan, which we found by observation to be in latitude 48 ° .-23'-11". Like the Post of Tadoüsac, that of Metabetshuam is situated on an alluvial bank, though differing in the materials which compose it. It is here a soil in which clay predominates, but contains sufficient sand to give it fertility. Boulders of the rocks of the neighbourhood, and among them water-worn fragments of the secondary limestone we have just described with their imbedded fossils, are frequent. The fossils are generally of the same class as those found on the Manitouline chain of islands

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in Lake Huron, and have been mentioned. The most remarkable of the fossil remains we saw, was a trilobite (entomolithes paradoxus of Linnæus.) (See plate. 9) It is believed to be one of the largest that has ever been seen, and is deserving of notice, belonging as it does to a class of animals with which naturalists are totally unacquainted, and of which Parkinson says, "We must content ourselves, I believe, with allowing that no animal resembling it is known." It is supposed to be a species of crab. A drawing of the same animal, though not precisely of the same variety, may be seen forming the frontispiece to the 3d edition of Bakewell's "Introduction to Geology." Although the trilobite is very characteristic of the limestone in the Lower Province, it is the small species; no other gigantic specimen has been noticed; Dr. Bigsby, however met with it on Lake Huron. Some sections of the pigmy tribolite (if such an expression may be allowed) from Beauport and Montmorenci, bear a strong resemblance in form to moths. We have in our possession an organic remain from the latter place, which appears to represent a trilobite inserted in the siphuncular cavity of a small orthoceratite. If this conjecture be correct, it is worthy of attention, because it agrees with the known habits of the crustaceous tribe of animals which seek their food by entering into shellfish. Univalves have been brought up to Quebec from the Gulf of St. Lawrence, in which when partly mutilated, may be seen small crabs that have probably perished in an ineffectual attempt to retreat. A suitable punishment that should await all murderous intruders who steal upon the privacy of others, whether their object be to destroy life or to kill time.

The accompanying copper-plate impression is by Mr. Smillie, from another accurate drawing with which we were favoured by Lieut. Ditmus. In both cases the engraver had also the advantage of consulting the specimens.

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This trilobite is upon very schistose limestone, of a dark grey color internally, and yellowish white weathered surface. The fragment in which it was found is angular and detached; it had been used as a stepping stone to one of the outhouses at the Post, and probably had been brought by the ice to this shore from a place on the lake about three miles to the westward, where we found a limestone very similar to it, having a variable dip to the northward of from 10°. to 45°. and underlying a very schistose black limestone containing the impressions of small terebratulæ, and giving out a very fetid odour when struck. Although schistose in the large, this latter rock was very compact in the small, and would probably afford beautiful black slabs of marble. The schistose character, together with its black color, might occasion it to be mistaken for clay-slate, particularly as we have before described that rock as holding a similar position with regard to the limestone; but that position itself, the violent effervescence of the rock in acid, its imbedded organic remains and fetid odour, remove all doubt on the subject. The fawn coloured limestone was again observed here; it appears to be in considerable abundance. A large angular mass of white laminar marble was seen upon the shore; the rock itself must be near but probably at the bottom of the lake, from whence the mass in question has been thrown up.

From the Post of Mitabetshuan, conceived to be the most southerly point of the lake or nearly so, the River Peribonea, about its most northerly point, bore north—La Grande Decharge, N.E., and nearest point to the eastward, E.

We ascended the Metabetshuan River a short distance as far as some rapids; the right bank or that to the eastward, was found to be composed of a mixture of clay and sand, forming an alluvial ridge from fifty to eighty feet high. The western side of the river is low. Wheat, barley, oats, kitchen stuff of various kinds, cucumbers and melons, grow here to perfection; neither

neither soil nor climate can therefore be bad. Having broken the thermometers in the early stage of our journey, all our reports are deficient in thermometrical observations. Judging from our feelings and the agricultural facts above mentioned, there appears to be no difference between the climate on Lake St. John and that at Quebec. Mountains bound the view to southward of the Post, and at no great distance among these, we heard that a large deposite of a mineral, which from the description given of it, must be steatite or soapstone, is found. It probably marks the primary character of the mountains in which it occurs; near them the junction of the primary and secondary rocks may be expected to take place. We did not see it, for the clay-slate, although usually a primary rock, is here, by its alternation with fetid limestone, evidently of the transition or secondary class.

After crossing a turbulent sea, we arrived once more on our way back, at the mouth of La Belle Rivière, having completed the circuit of Lake St. John.

Before we take leave of this lake, we will here introduce a few remarks upon the general fertility of the land in its neighbourhood, which have occurred to us as explanatory of the cause of it.

When first the reports* of the House of Assembly respecting the Saguenay Country came under our observation, we were at a loss to account for this fertility. We imagined Lake St. John and the surrounding country to be, as it really is, a large basin, of which the lake is the lowest portion, with rivers running into it from all points of the compass save one, and bearing

* With regard to these reports, it is only justice to say, that after having attentively examined them, we think they are as creditable to the individuals who collected them as they are to the persons from whom they were obtained. We have, generally speaking, found them to be correct, and it will be seen that the latest reports rather confirm than afford any new information respecting the fertility of the soil and its capabilities for settling. Both Mr. Tache's and Mr. Panet's plans also, considering they are mere sketches, are very faithful.

ing with them the drainage of the lands they traversed. Supposing these lands to be composed almost entirely of rocks of the most infertile characters, such as granite and gneiss or aggregates in which silex abounds, they could not be looked to as the sources of the fertility in question. In this dilemma the action of a violent deluge was had recourse to, which by bringing soils from distant quarters, had accumulated here the materials of future fertilization. With this impression we visited the country. It was found to be composed, instead of granite and gneiss, for the most part of rocks which, however infertile some of them may be as such, are made up of minerals almost exclusively, the decomposition of which furnishes the best soils; such are syenite and trap rocks. On casting our eyes over the fine alluvial soils which characterize the country about Lake St. John and Chicoutimi, they exhibited no indication of the action of a violent deluge; on the contrary, they were found to be composed of the finest particles, which could only have been deposited in quiet waters.

On visiting Lake St. John, we found a rock forming a large portion of the shores and of its neighbourhood, the decomposition of which forms the finest clays. A little farther on the same lake, clay-slate and limestone are found to occupy a still larger portion, the former rock almost always associated with fertile soils furnished by its desintegration, while the latter, with few exceptions, need only be named as forming a portion of any country, to convey at once the fertility of that portion.

Examine the limestone: you find it the depository of the exuviæ of animals, tenants only of the ocean which now form a part of almost every one of its generally horizontal strata. The inference is obvious:—they and the limestone have been deposited here together, when Lake St. John and the surrounding country were covered by the sea; and it is almost equally obvious

obvious to us, that the fine clays and marls, in which this country abounds, are the washings of the decomposing rocks, which, being first suspended in the water as an impalpable powder, afterwards subside at the bases and on the gently sloping sides of the rocks from whence they are derived.

Mr. Nixon, upon his return, kindly furnished the following specimens of Rocks and Earths, with the information as to where they were procured:

ROCKS.

No. 1.—Of felspar alone, similar to all the rocks from the Grand Décharge to Koucouathime river.—From the second rapid on the Peribonea river this specimen was taken, and Mr. Nixon describes the same rock as extending from the foot of the first rapid to the foot of the third fall, forming rocky banks on both sides; what soil there is in the distance is sandy. This rock was traversed by a vein of granite, the felspar in which was in large crystals and greatly predominating.

2.—A detatched mass of magnetic iron near No. 1.

3.—Like No. 1—From the great falls on the Peribonea.

4.—This is an equable mixture of hornblende and felspar, the latter having a glandular arrangement in the former bearing some resemblance to porphyry. In naming rocks composed of hornblende and felspar, we have invariably in this report called those traps in which the former mineral predominates, while the term syenite has been restricted to those in which the felspar is the most abundant mineral. In the present instance therefore in which there is no predominancy of either, both terms are equally applicable, but we have chosen that of trap because the felspar in it, by its resemblance to quartz, bestows upon the specimen in question a character of coincidence with the

trap we have described, which character is wanting in the syenites—From David River.

5.—A mixture of hornblende and felspar, the former predominating—consequently a trap—from the falls of the River Ouitchouan, two hundred and thirty-six feet high, according to Mr. Bouchette.

6.—Similar to No. 1.—From La Petite Décharge—a vein of white felspar traverses this rock.

EARTHS.

No. 1.—A mixture of sand, clay, vegetable matter and iron—The sand in excess—indifferent soil—River Peribonea.

2.—The same as No. 1—with little or no iron—R. Peribonea.

3.—A loam or brick earth—good soil—Lake Nohaduito—taken from under the vegetable matter.

4.—Sandy bad soil laying beneath No. 3, a foot deep and resting on No 5.

5.—A good marly clay—same thickness as No. 4, and resting on No. 6.

6.—An excellent marly clay.

7.—A fine dark vegetable mould, twenty paces from the edge of a rivulet running into Lake Nixon.

8.—Mixture of clay aud sand—tolerable soil—do.

9.—Sand, clay, vegetable earth and iron—light and sandy—do.

10.—Ditto ditto ditto—River Baddeley.

11.—Sand and vegetable earth—poor soil—ditto.

Upon reashing Tadousac, on our return home, its latitude was made, 48°. 6′ 38″—and immediately afterwards we entered the St. Lawrence, on our way to St. Paul's Bay, passing Pointe aux Bouleaux, of which some account was given in

in the early pages of this report. Between Pointe aux Bouleaux and Echaufaud des Basques, nearly isolated masses of what was considered to be granite, were seen; they are shaped like a dome or rounded hay-cock, but generally the outline of the mountains on the coast, did not differ materially from that of the Saguenay; the former are not however so precipitous. Having landed at Echaufaud-des-Basques, the predominating rock was found to be syenitic granite, in which trap was observed, forming dykes or veins. A vein composed of red felspar, quartz, hornblende and magnetic iron, traverses this rock. Flesh red crystals of felspar, and white masses of quartz, forming large distinct concretions, were seen under the same circumstances. From a detached mass of syenitic granite, large kidneys of a fine black hornblende were taken, and also a beautiful specimen of light blue felspar having the lustre of satin.

The surface of the rock here, was observed to have the same baked and porous aspect as before described. This appearance is not in all cases confined to the surface. A specimen brought from Ance-aux-Femmes, in the Saguenay, has been already described, as possessing the character of porosity, both internally and externally, in so perfect a manner, as to be a fair sample of a mill-stone.

It would prove a mere repetition to be as circumstantial in our discription of the rocks, on the north shore of the St. Lawrence, between Tadousac and Mal-Baie, as we have been between the former place and Chicoutimi—We will therefore confine ourselves to a few remarks which will embrace those striking or important differences observed.

Though trap was occasionally seen, forming dykes, veins and imbedded pieces in the predominating rock (a syenite, syenitic granite, or syenitic gneiss,) no rocky masses of it, whether stratified or unstratified were perceived. It is not meant to assert, however, that they may not be found, but only to imply, that they are by no means so common as in the Sa-

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guenay river, particularly in that portion of it between Chicoutimi, and La Buole, from the last of which places, towards the mouth of the Saguenay, the rocks become more quartoze and less amphibolic or hornblendic, and pass from trap and syenite into syenitic gneiss and granite. To this latter cause may be attributed the comparative narrowness of the river at its entrance.

As Mal-Baie is approached, the rocks are observed to be crowded with veins of trap, felspar, quartz and granite, to an excess. These veins are generally parallel to each other, frequently contorted to a degree that is scarcely credible. In some places they are absolutely countless, and being composed of different coloured minerals, as white quartz, black hornblende, red felspar, &c., they bestow on the rock at once a singular and beautiful appearance, to which an artist alone could do justice, as it is totally beyond the power of description to convey.

It is worthy of observation, that the granite veins which have been described as traversing the rocks, both in the St. Lawrence and Saguenay rivers, were found to be composed, whenever examined, of large flesh coloured crystals of felspar, large pieces of grey or white quartz, and mica in hexagonal plates, about the size of a farthing, the whole forming a variety of graphic granite, differing widely in appearance from those fine grained granites, which have been described as occurring in apparently stratified masses in the Saguenay and elsewhere, and among the constituents of which it is often difficult to say whether mica or hornblende is to be ranked, or whether they are not both of them present, the small black specks disseminated through the aggregate, resembling either of those minerals. The plates of mica in these veins, were "few ing and far between:" the rarity of this mineral in the rocks under description has been before alluded to.

A number of recent shells principally echini or sea-eggs are found upon the rocks, and sometimes at an elevation, to occa-

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sion a false inference to be drawn as to the height of the spring tides. These are probably brought by birds, as the elevated position they occupy, is far beyond the reach of any tide in the St. Lawrence.

On entering Mal Baie, a rock was observed, forming a long precipitous scarp, which had the appearance of being horizontally stratified. It is of a greyish colour. This we afterwards found to be a limestone and is the same that Dr. Bigsby describes as a calcareous conglomerate full of organic remains, and having gneiss and mica slate abutting aagainst it.

Partaking of the well known hospitality of Mr. and Mrs. M'Nicol for one day, we had leasure to examine some of the rocks in this place, which are particularly interesting, as it is here that the primary and secondary formations occur together. On the shore near the house we observed black fetid limestone, and we believe gneiss, but this spot was not particularly examined. Crossing a bridge over the Mal Baie river, we proceeded across an alluvial ridge, towards Dr. Fraser's house on the eastern side of this bay. Pursuing our walk on the shore, and down the river, we first came again on the black fetid limestone observed on the other side of the bay. Then examining a block which had fallen from the precipice above (the same noticed on entering the bay) it was found to consist of an indurated limestone of a greyish colour and the conjecture before entertained respecting its horizontal stratification was confirmed. It forms a perpendicular scarp, perhaps one hundred and fifty feet high. Beyond the black fetid limestone, micaceous schist was met with, for the first time, containing veins of quartz, sometimes of a slight rosy hue, and common garnets. We saw none of the beautiful foliated garnet, which is known to occur in this rock. The dip of the mica slate is gently to the west. Continuing our walk, we came upon a rock, which appeared to consist of stratified masses of pure quartz; after which we met with syenitic gneiss. All the basset edges of these rocks, from the black limestone downwards, crop out on the shore, in conformable strata, the

the dip of which is to the westward. Between the horizontal limestone, which lays over the basset edges of these rocks, and the black limestone, a sort of calcareous sandstone is observed, of a light green colour possessing the compactness of fine grained grey wacke. We do not remember to which of the two rocks it is conformable, but believe it is to the uppermost; its effervescence in acid is slight.

Mal-bay and its neighbourhood have long been remarkable for the frequency of earthquakes; it was not probable therefore that we should omit to make enquiries respecting them, connected as they are with the subject under examination. Through the politeness of Mr. and Mrs. M'Nicol the following information was obtained. Shocks are most frequent in January and February; their direction appears to be northwest; the duration of the movement is about one minute, and notice of the coming motion is generally given by a noise like a chimney on fire, sometimes accompanied by two distinct blows. The weather is sometimes sultry, previously at others, cold; in the former case, the weather becomes cold after the shock, and in the latter, mild: in short, it is always accompanied by a change of weather. They occur about nine or ten times a year, and are more generally observed in the night than in the day. When they happen in foggy weather it clears up subsequently. About thirty-six years ago shocks were much more violent. Dr. Fraser of Malbay, to whom this account was shown, agrees generally with it, but thinks the number of shocks annually underrated.

Mal-Bay or, Murray Bay, as the inhabitants prefer calling it, enters deep into the north shore, and the greater proportion becomes dry at low water. The land which encloses the bay is rather elevated and rocky, but between it and the high water-mark on the western side, there is a flat or gently undulated alluvial soil. The character of most of this is sandy, but that on which Mr. McNicol's farm is situated is of a superior description, composed of clay, sand, and probably lime

derived

derived from its vicinity to limestone. We were informed that the general character of the soil improves on advancing into the interior, and that a broad fertile valley similar to the one which accompanies the St. Paul's Bay River, and with which it is connected by a cross valley, also accompanies the Mal-Bay River in rear of the settlement. Walking through the fields at the back of Mr. M'Nicol's house, we observed several small cone-shaped hillocks from fifteen to twenty feet high composed of alluvial soil, which from their form and isolated appearance were supposed to be in some way connected with the cause of the earthquakes.

Availing ourselves of the high tide we left this bay, but were detained a few hours at its westernmost point by the roughness of the river. This interval was occupied in examining the limestone rock of which the point consists. Like that on the eastern side of the bay it is one of the oldest of the secondary class, and contains numerous organic remains, principally orthoceratites. The weathering of the rock exhibits many longitudinal sections of these fossil multilocular univalves, giving them something the appearance of fish-bones for which they have been mistaken. It is well known to those who interest themselves on the subject, that the fossil corallines of the *genus huronia*, of which there are some beautifully correct drawings among the plates to the sixth volume of the Geological Transactions, bear a remarkable resemblance to vertibræ, so much so as to have deceived professional men; of these however we saw none. Some of this limestone is of a very siliceous character and appears to pass into sandstone; some again is conglomerated, and holds imbedded rounded fragments of white quartz; in this the fossil organic remains appear most to abound. In the upper portion of this limestone there is a small cavern into which you may descend for a few yards. The sides and roof are in many places coated with a white incrustation, having none of

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the crystalline aspect of stalactite, but softer and more resembling analogous appearances on the roofs of old brick or stone arches. This cavern descends very rapidly, but we were soon arrested by its narrowing suddenly to a mere crack, through which however the boy who accompanied us said he had passed, and found that the cavern on the other side becomes more spacious, but his fears would not allow him to investigate further. This part of the passage might be excavated at a trifling expence, which might be fully repaid by the extent, beauty and singularity of appearance which these caverns often present. Dr. Fraser has been spoken to on the subject, from whom more information is shortly expected.

The shore between Murray Bay and St. Paul's Bay is by no means so precipitous as that between the former place and the mouth of the Saguenay, although it gradually retires back into lofty hills, over which, on account of the crowded state of the canoe, Messrs. Bowen and Goldie passed. They describe the road as one continued succession of abrupt rise and fall. Some rocks, the surfaces of which are white, were observed forming much of the shore, but as we did not touch them, it remains doubtful whether they were felspathic or limestone. Beyond these, a black rock, traversed by veins of white calcareous spar, was seen; probably the transition limestone of some authors, and the same as that observed at Murray Bay.

On passing Les-Eboulemens, we looked in vain for the cause of that part of the country being so called; Isle aux Coudres also, which Charlevoix represents as having been detached from the main by a violent earthquake, exhibits no other character, on passing, to indicate such a catastrophe, than a whirlpool between it and the main, which at low water becomes dangerous for boats, and canoes by the risk they run of being thrown by it on the limestone rocks to the right of the entrance into St. Paul's Bay: appearances indicating some event

event of the kind are said to be seen, however, in many places on the shore between Port au Persil and St. Paul's Bay, such as the roots and trunks &c. of prostrate trees, being covered with soil and loose masses of rock.

The limestone mentioned last is of an excellent description; it occurs in dark compact strata, dipping to the westward at an angle of about 45°. It has all the appearance of being an excellent building material, in great abundance and easily quarried.

At the entrance into St. Paul's Bay, the mountains which form the back ground have a very picturesque appearance, rising in cone-shaped peaks and in alpine ranges; they are, however, not very elevated.

It is not perhaps generally known that there exists highly respectable evidence of a volcanic eruption having happened somewhere in the interior in the rear of St. Paul's Bay. No one we think will feel disposed to doubt the fact after perusing the following account of it with which, through the politeness of Mr. Gagnon and Mr. Chaperon, we have been furnished. It is the former gentleman who writes:—

"Au defait du journal que se trouve ecarté, daignez recevoir ce que suit:

"Samedi, 6 Oct. 1791, à la Baie St. Paul, et autre lieu circonvoisin, vers les sept heures et quart du soir, se fit sentir un fort tremblement de terre: toute la nuit fut troublée par de petits repetés, et entre par un tremoussement courant dans l'est. Les quarante et un jours suivans tremblerent, depuis deux coups jusqu'a cinq par jour. Le Lundi 8 Oct. fut d'un bon tiers moins fort que le premier (du 5) les autres furent que des petits, ou broussemens; le tems toujours obscur. Avant la nuit du 26 au 27, je n'avais pas encore remarqué d'éruption de fumée epaisse, par fois ondoyante de flamme; la temperature a 7½ heures du soir était à 11° au dessous de zero du thermo-

metre de Reaumur (plus 7¼ of Fahr.) et le lendemain au matin à 6½ heures la chaleur se trouve montée a 21° (plus 79¼ of Fahr.) Deux montagnes près de ma demeure ouest-quarante quelques degres-nord laissent un passage à la vue entre elles pour laisser voir loin. C'est par cette passe que je vis une continuelle eruption, melée de fumée et de flamme, qui jetoit fort sur l'horizon ; d'autres fois se tourmentaient entre elles comme trop genées dans leur issue. J'ai remarqué plusieurs fois que cette éruption est presque toujours suivie de tremblement pour le même jour ; et quand il manque il s'ensuit un jour obscur et jaune. Quand le tremblement arrive, on peut predire qu'il va être d'autant plus procheque cette agitation de boucanne force pour sortir. Quelques personnes auxquelles j'avais montré ces preparations du tremblement m'on prevenu a leur tour que dans un moment la terre va trembler, et l'effet le confirma, Enfin cette nuit du 26 au 27 forma un grand spectacle d'admiration, toute l'atmosphère fut en feu, et agitée ; la face souffrait de la chaleur, le tems etant fort calme ; l'eruption fut continuelle toute la nuit avec des flammes. L'approche certaine du tremblement se conhait quand par la passe entre les deux montagnes, on voit un nuage, ou boucanne, arrété, ou agité, et qu'a droit et à gauche l'horizon est parfaitement clair,"

This description, as far as it extends, agrees so well with the known phenomena of active volcanoes, that little doubt can be entertained of the flame seen by Mr. Gagnon proceeding from any other source than that of an eruption. Mr. Andrew Stuart was aware of the existence of a similar well founded report when he gave us discretionary authority, upon discharging our canoe, to proceed in search of the volcano, provided after having ascertained particulars, there should exist in our judgment any probability of finding it. We were decided to give up the attempt by the following circumstances :—

1. It might lay at a greater distance than could be reached at so late a period in the season, (12th September.)

2. The known fertility of volcanic countries would, in the interval of thirty seven years of inactivity, have caused those parts once ravaged by an eruption, to be covered by a deep and dense mass of both living and dead vegetable matter, concealing all the rocks, and obliterating all the traces of a crater by which only an extinct or long inactive volcano could be recognized.

3. We were anxious to examine an extensive deposite of magnetic iron which lay up the river in a different direction.

Upon an examination of the greater portion of the rocks we have attempted to describe, a Vulcanist or follower of Hutton, would we think suspect that the country of which they are characteristic had been the theatre of volcanic activity in very ancient times, and upon finding his conjectures supported by the inferential evidence which these *local** earthquakes afford, and that of the more direct and positive description contained in Mr. Gagnon's communication, his doubts on the subject, would entirely vanish. For ourselves, being neither Neptunian nor Vulcanist, we leave these interesting but often vague enquiries to those who are better qualified to indulge in them, being satisfied with the more humble, though not less useful task of describing facts.

Although it is believed that no one now living, except Mr. Gagnon himself saw the flames, &c., many were witnesses to the comparative violence of the earthquakes of 1791. The first is accounted for by saying that there were few settlers at St. Paul's Bay at the time, and fewer whose habits or education would lead them to take notice of a phenomenon which among the vulgar might be supposed to be merely a fire in the woods, had they seen it.

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* They are not felt on the southern shore of the St. Lawrence nor at St. Joachim, to the westward, nor Tadousac to the eastward.

A fall of ashes covering the snow is also within the remembrance of many, but of this interesting fact we have no further particulars. Earthquakes at St. Paul's Bay do not appear to be so frequent nor so sensibly felt as at Malbay.

Three or four leagues up the St. Paul's Bay river, or la Rivière du Gouffre as it is called, there is at the distance of from one hundred yards to two miles from its banks, an extensive deposite of magnetic iron * of which we are able to afford some information from actual inspection.

The river itself is not easily ascended being full of rapids, but the goodness of a road on its right bank renders this inconvenience lighter. Over the road, composed of a sandy alluvium, we proceeded and entered a beautiful valley through which this river circuitously takes its course. The sandy nature of the soil at the mouth of this river opposes little resistance to the action of the current, which where strongest steals upon the shore contiguous, leaving a proportionable space dry on the opposite side, and in this way one proprietor of land finds himself possessed of the property of his neighbour. When property in this place becomes more valuable, and this natural encroachment more aggravated, it will probably become a subject of litigation. Mr. Chaperon of St. Paul's Bay will soon have to remove two store-houses which the current threatens to undermine.

On advancing, the river retires from the road to the right, and while the former preserves, as is obvious, the lowest level of the valley, the latter pursues a more direct course over a sandy bank. As we passed this bank and cast our eyes on the valley

* This deposite was known in the time of Charlevoix; for according to that author a miner was engaged by Mr. Talon, the intendent to explore these mines, who reported favourably of them. This man is said to have observed wherever he worked, traces of the earthquake of 1663. We saw nothing of this kind. Previous to our visit to the place, the Surveyor General had brought to Quebec specimens of the ore and information as to its being abundant.

valley below, we were reminded of the vale of Clwyd in North Wales. It is however neither so wide nor so long. The mountains on each side are tolerably elevated and of course rocky, but the valley is gently undulated land of a fine quality, being a mixture of clay, sand and probably carbonate of lime which abounds in the neighbourhood. This valley continues for about six or seven leagues, and is perhaps half a league wide. The road (an excellent one) extends about five and a half leagues up this valley, beyond which a pathway leads to the remotest settlements. There is a cross valley on the left bank of the river which is said to communicate with the valley of the Malbay river.

The parish of St. Urbain is situated towards the upper end of the valley, and it was here that we stopped to examine the deposite of iron. One bed lays westward of Vincent Tremblay's house on the summit of the hill, and about two miles from the river. Having crossed the valley a distance of about a mile, we came to the foot of the hill which rises at an angle of from 10o. to 15o. Here we found large detached masses of this ore, and ascending the hill for about another mile we reached the summit. When we arrived at this place it was found to be characterized by the total absence of trees, and looked like a piece of cleared land of about three or four acres in extent. Near the centre of this, and where the ground began to fall, the ore was seen cropping out of the ground, in one black metallic mass of considerable size. We traced it without excavation for about sixty yards in length, and perhaps three in width, here and there covered by moss or a few shrubs only. The rock with which the ore is associated is a pale syenite; in it the felspar is very predominating, the weathering of which gives a cream colour to the rock externally. That we saw was not solid but in loose angular rotten pieces, and this we found to be the case upon subsequently probing to

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ascertain the comparative abundance, of the ore as appears from the following satisfactory account of some work Vincent Tremblay had been instructed to perform during our absence on an excursion to the northward.

No. 1.—Excavated a hole on the north side of the visible iron ore and at about two perches distance, where the same ore was found about two feet below the soil consisting of rotten rock.

2.—A second hole was formed on the south side of the visible ore, and about ninety feet distant, here the same ore was again found at the depth of one foot six inches of the same soil.

3.—About six yards farther to the south of the last, and at the depth of two feet and a half of rotten rock the same ore was found.

4. North west of the visible ore and about ninety feet distant the same ore was found at the depth of two feet of the same soil.

From this it appears that there is here a considerable supply almost at the surface; indeed we suspect that the whole of the cleared patch before mentioned is occasioned by its immediate presence. We were informed that several places in the neighbourhood were equally abundant in ore, and when about to descend the La Gouffre on our return to St. Paul's Bay, Mr. Bowen discovered a deposite of this mineral which appeared abundant; it is situated in the left bank, about a mile below Vincent Tremblay's house, and about two hundred feet from the waters' edge. Having left instructions with Vincent Tremblay to investigate further, we lately received from him the following information accompanied by specimens.

No. 5.—"Ces deux morceaux ont été pris sur les terres de Damase Fortin et de Vincent Tremblay, fils, environ douze arpens plus au nord que la mine que vous avez vue et en-

environ quinze arpens plus près de la rivière du Gouffre. Il se trouve un cap continu du même metal et il est parallel à l'horizon. Il se trouve environ un pied en terre à l'endroit ou je l'ai examiné, mais comme c'est dans un endroit ou le terrein est pendant, il doit se trouver à une plus grande profondeur à mesure que l'on avance.

6.—" Ce morceau à été pris au nord-est de la rivière du Gouffre, environ dix arpens au-dessus de l'endroit ou vous êtes embarqué pour la descendre, et à un arpent de la dite rivière. C'est un cap coupé perpendiculairement de la hauteur d'environ vingt pieds sur une largeur d'environ quarante.

7.—" Ces quatre morceaux ont été pris sur la terre d'Augustin Tremblay au nord est de la rivière du Gouffre vis-a-vis l'endroit ou vous êtes embarqué pour la descendre et environ six arpens de la dite rivière. Il sort de la côte un cap de même metal dont j'ai découvert environ trois perches.

8.—" Ces morceaux ont été pris sur la terre d'Antoine Pagé à environ quinze arpens de la rivière du Gouffre, et environ une lieue plus sud que celle que vous avez vue. Il s'en trouve un cap plein.

9.—" Ces morceaux ont été pris entre Möise Tremblay et Elie Fortin, environ huit arpens plus nord que celle que vous avez vue, et vingt-sept arpens plus près de la rivière du Gouffre. J'ai decouvert de ce metal sur environ un demi-arpent quarré, mais je crois qu'il y en a un plus grand etendu."

Before any observations are made upon the foregoing ores, we will here introduce an account of our journey northwards adverted to. The object of this journey was twofold; to see a little more of the interior, and to examine another deposite of ma-

magnetic iron. In the first part of our journey we met with tolerable land, although by leaving the valley to our right and ascending the hills we got among the rocks and an inferior soil. These rocks are universally felspathic, and of a cream-coloured external surface. After proceeding about two leagues we came to the rounded brow of a hill which afforded us a beautiful view of a part of the chain of mountains which we had seen on entering the bay, and in which the St. Paul's Bay river has its source. The summits of these mountains were rounded, perfectly bare, whitened and precipitous. We were informed by our guide that after crossing these mountains a wide fertile plain is reached, through which the Malbay river takes its course; he was in the constant habit of crossing this plain with Indian hunters, with whom he was associated. Continuing our route a little further we came to the flat surface of a rock several yards of which were totally bare and whitened. All we had before seen in our route were so covered up with vegetation, presenting only an angle to the eye, that it was not easy to decide with certainty whether they were in place or not, but here no doubt could exist on the subject. It was one of those tabular masses so common in felspathic rocks, composed of brown felspar, quartz and hornblende; the quartz was very distinct on the weathered surface, from which it projected in grey grains, owing to the greater resistance it opposes to the action of the atmosphere.

Distinct concretions of a very laminar hornblende, possessing polar magnetism, were observed in this rock.

We reached our encampment for the night at the foot of the chain, having passed over in the course of the day much tolerably good land, well watered by small brooks and streams issuing from lakes, along the side of one of which we passed. Rising early in the morning we commenced the ascent of the chain, and on the summit of the lowest part of its ridge, we saw

saw projecting from the side of the mountain iron ore similar to that before seen at St. Urbain, but of a purer quality, though not by any means in such abundance. It here occurs in a visible patch about one foot wide and perhaps three feet long. As it is in solid rock it would not be easily extracted if found upon excavation to form a continuous bed or vein. The rock in which this ore is imbedded is as before a pale syenite, in which the felspar only is very distinct. It is worthy of remark that the extensive deposite of iron ore at Marmora, Upper Canada is, according to Dr. Bigsby, in the immediate neighbourhood, though not in contact with a pale syenite. The metallic blackness of this ore contrasts strongly with the whitened surface of the rock in which it is imbedded.

Knowing that the forests in this country are extremely liable to spontaneous or accidental ignition, the whitened exterior of these rocks is often naturally enough attributed to that cause, particularly, as was the case here, where other less questionable traces of fire appear; but weather, acting upon the alkali, which the felspar in these rocks contains, causes an incipient decomposition to take place on their surfaces, by which an imperfect kaolin or porcelain clay is formed, and hence arises this whitened aspect. Fire would certainly assist this decomposition, but from the quantity of iron in these rocks their surfaces would, we think, be rather reddened than whitened by it. Other deposites of iron ore in these mountains were heard of, but they were not visited, satisfied of its abundance in places more conveniently situated. It may be stated, however, that a Canadian of the name of Baptiste Bridet, gave us on our return to St. Urbain, the following information. Between the pass of the mountains and Lake Bicene, about a league asunder, he observed at short intervals great quantities of iron ore jutting out of the rock; also between Lake Bicene and a place called Le Grand Bris, about ten acres further, he saw the same ap-

pearance. Being questioned as to its abundance more particularly, he said that it occurs in veins from six inches to two feet wide and in rounded blotches from six to eight feet thick.

The highest mountain in that part of the chain where we were, commands a most beautiful and extensive view of the surrounding country.

We will now give the mineralogical characters of that deposite of ore which we first met with at St. Urbain; after doing which, only a few further remarks on the others will be necessary, as they differ from each other principally by being more or less mixed with impurities. They are almost all of them remarkable for the want of the magnetic character, although possessing the metallic blackness, structure, and other points of agreement with the magnetic oxide of iron to which species they undoubtedly belong.

MINERALOGICAL CHARACTERS OF SPECIMENS.

Nos. 1 to 4.—Colour, iron black, but break into fragments, the surfaces of which are much tarnished by rust; no particular structure could be observed; some parts were indistinctly laminated, but the general mass appears to be compact granular. The fracture when not effected in the direction of a rusty seam is uneven. They cannot be scratched by the knife, but are easily broken, and do not give fire under the hammer; their powder is quite black; specific gravity about 4. 5. Some portion of the ore from this deposit had a vitrified and porous aspect on the surface like cast iron. They are not magnetic before the application of heat. Before the blow-pipe they do not alter in any other respect than by becoming magnetic. With borax they fuse into

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a glass of either a yellow or very light muddy green colour; upon cooling the colour subsides or nearly so. These ores were associated with a mixture of mica, carbonate of lime or iron, and what was conceived to be epidote.

5.—These specimens have a very good appearance, and are more free from foreign substances than some of the others; one of them, however, has coccolite of a yellowish brown colour, disseminated throughout it. Their specific gravity varies from 4. to 4. 5.

6.—This is the same description of ore as that found by Mr. Bowen, and comes nearly from the same place; it is not quite so good an ore as either of the preceding, being more mixed up with foreign substances, particularly epidote, by which its specific gravity is reduced to 4.

7.—These four specimens differ much among themselves, and do not bear the aspect of having been taken from the same place; one of them has a crystalline structure, and appears to be composed of octohedral grains, while another is earthy and possesses less of the metallic aspect.

8.—Magnetic with polarity; an excellent ore.

9.—This is a very good specimen of bog ore, and valuable if abundant. It probably occurs in greater quantity than has been yet ascertained, as generally where there is a large deposite of rock ore (as the magnetic oxide of iron is called) occupying elevated situations, there is also a deposite of bog ore beneath in the low swampy lands, the latter originating with the former.

It does not appear easy to account for the want of the magnetic character in these ores before they have been exposed to heat. Cleaveland says, that "according to the observations

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of Werner and Gibbs, this oxide of iron is not magnetic while remaining at a considerable depth below the surface of the earth, but soon acquires this property after exposure to air and light." We must seek other causes to account for the magnetic deficiency in the present instance, as the specimens in question were taken from the surface and possess no more magnetism at the present moment than they did at first. It may be owing to one or more of the following causes; the presence of oxygen above 30 per cent, of sulphur above 40, of carbon, of phosphorus, of arsenic, of manganese and of antimony; of these sulphur, phosphorus, arsenic, manganese and antimony injure the ore, by either rendering it difficultly fusible or its cast-iron brittle, often both. Carbon, on the contrary, improves the quality of the cast-iron, renders the ore more easily fusible and diminishes the consumption of fuel. We cannot say to which of these, or if to any of them is owing the magnetic deficiency, we can only observe that before the blowpipe no fumes of sulphur, arsenic nor of antimony were perceived. From sixty to seventy per cent. of cast iron may be expected from the magnetic ores, and from thirty to forty from the bog ore.

The vicinity of limestone as a flux bestows additional value on these deposites. It is probable that the limestone that was seen at the entrance into St. Paul's Bay may extend thus far. We saw two or three varieties of an excellent description near a small kiln in front of the chapel at St. Urbain, which were said to have been taken from the bank on the opposite or left side of the river; some contained organic remains, while others had more the aspect of a compact marble, and were free from them. We were informed that lime stone was also to be seen on the summit of the hill opposite the chapel, where indeed it was ultimately found, but our guide took us first to several felspathose rocks deceived by their whitened surfaces.

Wishing

Wishing to ascertain the capabilities of the river we descended it in an old wooden canoe. This river may be considered as one continued rapid, though of moderate violence; the only obstacles in which to its free navigation arise from an accumulation of boulders in several parts of its channel, over which it is difficult to pass without striking. This we did repeatedly, and once or twice were nearly swamped, but more owing to the unskilfulness of our guide than from any other cause; however the inconvenience of a good ducking would have been the only penalty had the canoe actually filled, for the river is in most places shallow. If there were any sufficient object to warrant the expence, such as the establishment by Government of an iron foundry, there is no doubt that the river might be rendered navigable for batteaux by removing only such of the boulders as are most in the way of the channel; for we believe that no rock in place offers any obstacle. To drown these boulders would not be easy, and would occasion a great loss of excellent land, without expensive banks were formed to retain the waters. This river is very circuitous in its course, surprisingly so, considering the rapidity of its current; it owes this character to the alluvial bed it traverses. By it the river is rendered perhaps one-third longer than the road, between St. Urbain's and the bay, so that whatever capabilities might be given to the river, it is probable that all materials for the supply of an establishment, such as we have named above, would be transported over land from the bay, while the articles manufactured would be sent down by the river. Such is the practice at Mr. Bell's well-conducted establishment on the St. Maurice river, up which the returning boats always poll empty. With numerous stoppages we were only five hours descending.

The height of the banks on either side the river varies from one foot to fifty. Rock in place was observed forming the bank in a few places. It was said to be limestone. Our

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examination of all parts of this river was necessarily hurried, for the expectation we were in every moment of being upset, as we moved rapidly down the stream, would not allow us to improve to the utmost the short period we had to observe at each turn of it. Near the entrance into the bay from the river one small limestone* rock was observed lifting its head above water in mid-channel.

Previously to leaving the bay on our journey into the interior we had been hospitably received at the house of Mr. Chaperon, and on our return his reception of us was even if possible warmer. But the fear of abusing his civility was an additional motive to depart, which we did the night of our return. Failing in our attempt, however, to reach Quebec by water, on account of contrary winds, we proceeded overland through the *Capes*, which afforded us the opportunity of seeing a country unexpectedly well calculated for settlement; the existence of which a person would have some difficulty in believing who had only seen that barren section of it exposed on the northern shore of the St. Lawrence, between Cape Tourmente and St. Paul's Bay. It has already attracted some attention and in our opinion deserves much more; for, independently of its own capabilities, it is connected by an uninterrupted broad band of cultivable land, with Quebec on one side and St. Paul's Bay, Malbay and the still broader tracts behind them on the other. A bounty has lately been offered to induce individuals to settle on this land, and a road has been opened, at the expence of the Colonial Government, connecting St. Joachim with St. Paul's Bay. Over this road we passed, and found a good log hut built on building, with a few acres cleared

* Specimens of a white granular limestone have been brought to Quebec from St. Paul's Bay, containing threads and masses of a very argentiferous galena. If some of this galena be powdered and dissolved in nitric acid, a bright copper wire inserted in the solution will after some time be coated with a thick muddy deposite. If this be collected and exposed on charcoal to the blowpipe a bead of pure silver will be obtained.

cleared around it, at every league or thereabout. The land through which the road runs is always tolerably good, in many places excellent, and it is intersected frequently by small rivers and streams, favouring its drainage, the want of which many portions of the road attest, particularly towards St. Joachim.

This road possesses two excellent characters; it is remarkably straight and remarkably level; for, excepting at the two extremities of it, St. Paul's Bay and St. Joachim, at the former where it passes over limestone, and at the latter granite, we do not remember any other rise of any consequence. The first part of the road is over the same alluvial deposite, through which the river du Gouffre passes, and which continues in one level plain to the foot of the limestone ridge. On ascending this the soil becomes more sandy, but it soon after improves and is then a mixture of clay, sand and iron, to the latter of which it owes the yellow or red colour it sometimes possesses. The road is excellent for a distance of four leagues; it then becomes very boggy and in some places quite impassable for carts. It is only, in such places, by sinking up to the knees in a stinking mass of mud, loaded with carburetted hydrogen, that the pedestrian is able to proceed. This character, which continues more or less to the foot of Cape Tourment, is owing to the retentive nature of the soil, and its nearly horizontal position. In a short time the money which has been expended on the road will have been uselessly employed without an additional sum be advanced, to prevent it from being completely broken up.

There was nothing remarkable in the quality of the timber, which consisted principally of white birch, until we reached the ridge separating St. Joachim from the Cape lands, where we met with some of the finest description that had been seen during the whole journey, among which were some well-grown elms. The granite of Cape Tourment is known to be the depository

pository of large pieces of brown mica, which are dug out the size of the foot from crevices in the rock; some of it is exceedingly contorted. The rarity of mica in most of the rocks described in this essay renders this deposite the more deserving of attention.

Having closed our geognostical observations at the foot of Cape Tourment, we will now introduce a short recapitulation by way of summary which will include some remarks on the geological position of the rocks we have described. The rocks seen on our journey were the following:—

Nos. 1.—Granite.
2.—Micaceous Schist, (Mica Slate.)
3.—Quartz rock.
4.—Primary limestone?
5.—Syenites—including syenitic granite and syenitic gneiss.
6.—Trap rocks—or aggregates, in which hornblende predominates.
7.—Felspar rock—(sui generis.)
8.—Magnetic iron.
9.—Clay-slate.
10.—Grey wacke.
11.—Sandstone.
12.—Secondary limestone—including the transition of some authors.

Of all the granitic rocks we met with, perhaps that of Cape Tourment is the only one, free from an admixture of hornblende; for although we collected some specimens elsewhere, which appeared to be so, it might very well have been present, without our being able to detect it, on account of the smallness of the grain of those specimens, and the resemblance

blance of the hornblende to mica, which latter circumstance may indeed have occasioned one mineral to have been mistaken for the other. We cannot positively assert that the granite of Cape Tourment is free from hornblende; but we think so.

Micaceous schist was met with only at Mal-bay, where it has been already described as dipping to the west, having black fetid limestone above it, and quartz rock and syenitic gneiss below. It is here that the three classes of rocks (admitting the transition to be one) are seen together, and the geologist derives from their inspection assistance in his subsequent researches in the neighbourhood. Micaceous schist being in all cases a primary rock, the syenitic gneiss below it, must also be primary, which it appears necessary to establish, because the same rock was not found elsewhere, to be associated with a similar proof of its superior antiquity; rocks in which hornblende and felspar abound, being common to the "overlyin class" of Macculloch, with which many of the rocks in the Saguenay and elsewhere, have other points of agreement besides mere mineralogical identity.

The syenites and traps are the only rocks met with from the mouth of the Saguenay to the falls on La Belle Rivière, and they are likewise most characteristic of the north shore of the St. Lawrence, from Tadousac to Cape Tourment. Mr. Nixon met with syenite on David's River, a branch of the Perebonea, and with trap at the falls of Ouitchouan. A pale syenite is the predominating rock in rear of St. Paul's Bay; with this no trap is associated, and it is the deposite of extensive beds of magnetic iron, all of which is in favor of its primary character; it possesses no traces of stratification.

Quartz rock was seen only at Mal-bay, underlying micaceous schist, and between it and syenitic gneiss.

Primary limestone? associated with syenite gneiss and trap, occurs at Moulin à Baude. A loose mass of a similar descrip-

tion was found on the shore of lake St. John, near and to the westward of the Post of Mitabitshuan: it was angular and of an untravelled aspect.

The felspar rock (sui generis) alluded to, is one, many of those characters resemble those of Labrador felspar from which it differs principally by its want of iridescence. It forms the north eastern shore of Lake St. John, and its islands from the mouth of La Grande Décharge, to within a mile of the Koucouathime river, and was met with by Mr. Nixon in La Petite Décharge; also uninterruptedly forming a rocky bank from the foot of the first rapid in the Peribonea river, to the great falls on the same. We can say nothing of its rock associations, as they were not seen. It will probably fall under the general term syenite, although hornblende is a very rare ingredient in it.

Magnetic iron occurs in such extensive beds in rear of St. Paul's Bay, as to entitle it to be considered as a rock. It was met with in abundance in no other place.

Clay-slate, in association with grey wacke, was met with on the Island of Orleans. Both are well known to be very abundant in Lower-Canada, particularly in the neighbourhood of Quebec, and from thence towards the mouth of the St. Lawrence, but they are principally confined to the southern side of the river. Clay-slate was also met with on Lake St. John, for we still persist in calling by that name the rock we met with there, apparently alternating with fetid limestone.

Sandstone was met with only at Mal-bay, underlying horizontal limestone. The position of this sandstone answers to that of the old red sandstone, which, if it be, it is another instance among many of the absurdity of affixing such a name to a rock, which in the present instance is of a light greenish colour.

Secondary limestones, among which, for convenience, we include,

include, after the example of MacCulloch, the transition class, were found at Mal-bay, St. Paul's Bay and Lake St. John. The fetid limestone which overlies micaceous schist at St. Paul's Bay, we have conjectured to be a transition rock. On Lake St. John, secondary limestone (of the carboniforeus order ?) forms, with clay-slate, the southwest portion of the shore of the lake, from Pointe Blue to within three miles of the Post of Metabitshuan.* At page we have considered this to be a secondary rock in the limited sense of the Wernerians, and were surprised in consequence, to find it alternating with clay-slate. This opinion is now no longer entertained, as the very circumstance of the existance of such an alternation, together with its characterestic imbedded fossils, prove the rock to belong to the transition class or earliest of the secondary class of MacCulloch. It is thought that no secondary limestone (in the limited sense) was met with, without the horizontal rock at Mal-Bay be of that class, which is not improbable.

Information indeed has just been received, that a large deposit of bituminous coal, in association with limestone, has been discovered in the parish of St. Urbain, in rear of St. Paul's Bay, but we do not know what degree of credit to attach to the report. Believing the latest rocks in that neighbourhood, to be of the transition class, and consequently below the coal fields, we think it not likely that any considerable quantity of that

* Sir Alexander McKenzie states that the narrowest part of Lake Winipic is not more than two miles broad, at which place the west side is faced with rocks of nearly horizontal limestone about thirty feet high, while the east side is more elevated, and is composed of a dark grey granite. Immediately afterwards, he observes, that all the great lakes of the country are to be found between these extensive ranges of granite and limestone. Keating appears to think it probable that the excavation of this lake was occasioned by the easier decomposition of the strata at the junction of the two formations. It is certainly deserving of attention that the Lakes, Slave, Bear, Arthabasca, Winipic, Superior, Huron, Ontario, St. John and Mistassiny, have large deposits of secondary limestone on their shores, whilst some portion of these lakes is either granitic, syenitic or trappose. The limestone of Lake St. John must be either isolated or connected with the same formation at St. Pauls or Murray Bay. A considerable degree of probability is given to the latter conjecture, by the existence of a fine level country at the back of these settlements.

that mineral will be found there. Partial insignificant coltions of coal have been found in several places about Quebec, but they are no indication of its occurring in abundance.

It has been before said, that no appearance of the operation of a violent deluge was observed; on the contrary all the soils, in many places very deep, consisting of clays, marly clays and sand, were generally composed of the finest particles, without the trace of a boulder or even a pebble. The surface of the land was so far free from them, that we do not remember to have seen one that was waterworn, and evidently a travelled fragment, the position of which did not point directly to the route by which it came. It must not be omitted to mention, however, that with the exception of the several portages, our observations were confined to the shores of the rivers and lakes, which were met with in the Saguenay Country.

With the exception of those entering among the constituents of the rocks we met with, minerals were rarely seen. We did expect particularly to have found some of the numerous family of zeolites, tenants as usual of amigdoloidal trap; but neither of these nor of that rock, were any traces perceived; the pores of the vesicular syenites that were occasionally observed, being entirely empty. The following are the names of the few minerals we met with.

Calcareous Spar—Principally in the fetid limestone on lake St. John, and more particularly filling original cavities in its fossil organic remains.—The only instance of its being associated with trap, was the one stated while describing the rocks on the Saguenay.

Epidote? (earthy)—Apparently entering into the composition of some of the syenites in the Saguenay. Also associated in some abundance with magnetic iron in St. Paul's Bay.

Augite?

Augite ? probably enters into the composition of some of the traps, but it is not easy to distinguish it from hornblende.

Coccolite—Disseminated through magnetic iron, in rear of St. Paul's Bay.

Garnet (common)—Forming distinct nodules in micaceous schist at Mal-Bay ; the beautiful foliated variety of precious garnet, known to occur here, was not seen.

Magnetic Iron—In extensive beds in rear of St. Paul's Bay. Also forming veins and small distinct concretions in the syenites, and disseminated in small grains through some of the traps of the country we traversed.

Green Carbonate of Copper ?—In small traces among some of the syenites we met with.

It must be obvious to those instructed on the subject, that an individual rapidly traversing a country, will acquire a knowledge of its geognostical features more readily than he can hope to obtain of its mineralogy, because rocks, unlike minerals, occupy large spaces, and a specimen struck from one place is characterestic of many others ; but minerals, with the exception of those which enter among the constituents of rocks, are very partially deposited, and either chance favors the hasty tourist, or they must be very abundant in the places he seeks them, if many be met with.

Passing Cap Pillard, near St. Joachim, Mr. Nixon observed a vein of a green and white substance from three to six inches in thickness traversing the rock. Upon landing, specimens were procured which being examined subsequently, were found to be mixtures of carbonate of lime, under the form of calcareous spar, and a variety of fluate of lime, denominated chlorophane,

chlorophane, the characters of which are given below. The rock it was associated with, has not been examined.

Colour.—A lively light green.

Translucency.—Deeply translucent on the edges.

Structure.—Laminar, sometimes indistinctly so, approaching compact; intimately associated with calcaerous spar.

Lustre.—Dull, or none.

Hardness.—About that of fluor.

Powder.—Whitish green, and rough.

Specific Gravity.—3. 0.

Effect in Acid.—Throws out a few bubbles, owing probably to the calcareous spar it is associated with; *when sulphuric acid is poured upon it, in a state of powder, it gives out white fumes which corrode glass.*

Phosphorescence.—Placed on a heated poker it phosphoresces in a dark room with a beautiful green and purple colour. In boiling water it emits a palish light. This phosphorescence was observed after the mineral had been exposed to acid.

Effect of the Blowpipe.—When exposed to its exterior flame it *does not decrepitate*, but phosphoresces with a beautiful blue colour, like the interior flame of the blowpipe, and becomes white. When exposed to the interior flame it forms a white dull enamel.

Of the ancient Etruscans, Tyrrhenians or Tuscans, by Andrew Stuart, Esquire.

A strange mystery hangs over this people. Like the Greeks they had cultivated the arts at a very remote period; and the monuments which still remain, attest the excellence they had reached. From the Etruscans the Romans derived the greater part of their religious institutions; and Lucumo and the colony which he brought with him, transferred to Rome a civil wisdom which laid the corner stone of the fabric that was destined to be the temple of victory and empire.

When Rome was first established under the commanding genius of Romulus, the power of this people was in the wane and the brave Shepherd and his successors had to combat Etruscans superior to them in knowledge, but inferior in frugality and in public and private virtue. The withering influence of luxury and of vice had produced their usual effects, and the Etruscans were subjugated.

It is to be observed, that whilst in modern times, new settlements proceed from the low lands and along the banks of the rivers to the highlands and mountains; the exact converse of this must have taken place for a long time after the great deluge for reasons too obvious to be detailed. The fact is also supported by historical authority.

The chain of mountains which surround Italy have the form of a crescent whereof each extremity touches the sea: The earliest immigration must have been by land and either from or through this crescent.

The two shortest passages of the Alps are at their two extremities: That of the north which leads from Carniola into Frioul, and traverses the Julian Alps is the easiest of all. The southern passage touching the Mediterranean though less easy than the former is sufficiently short, and is passable even by savages. After these two passages the most convenient one is that of the Tyrol and Trentin.

Ancient Etruria was traversed from east to west by the Arno dividing it into two nearly equal parts, whereof one extended almost to the gates of Rome, and the other, bounded by Liguria, embraced a portion of the Genovese state, the valley of Magra and the old duchy of Carara and Lucca with its territory.

Perugia and Eugubio belonged to the Etruscans.

The people who inhabited this country were called by the Romans Etrusci & Tusci; by the Greeks Tyrrhenians: in their own language the general name of the nation was Rasena.

They spoke the same language as the Rhæti, the ancient inhabitants of the Trentin, and the Tyrol comprising that portion of the Alps through which flows the ancient Atheis (Pin. III. 24. Tit. Liv. v. 33.)

Upon these mountaineers first gaining a footing in Italy, the Rhoetian tide of emigration stopped at the northern bank of the Po, where they built two towns Mantua and Adria. The strong situation of the former of these towns enabled its inhabitants to resist the Gauls, and as it communicated with Rhætia, the Etruscans long maintained themselves in the country situated between the Po and the Adige.

The Etruscans soon extended their conquests to the south of the Po, and obtained possession of the whole country, from the Po to the Appenine Mountains, driving from it the old inhabitants, the Umbri, and destroying 300 of their cities.

Mr. Freret (Mem. de l'Acad. des Insc. et Belles Lettres, T. XXIII, p. 93,) very ingeniously fixes the period of this irruption and settlement. Varro in a passage cited by Censorinus, informs us that the Etruscans gave the name of an age to spaces of time of unequal duration and measured by the lives of particular individuals. The first of their ages was accounted from the foundation of the city or the establishment of the state—it lasted till the death of the survivor of all the citizens born on that day. At his death a new age

age began measured in the same way, and so on. The Gods failed not to announce by prodigies the commencement of each new age.

Now the Etruscan Historians living in the eighth age of their nation estimated, according to Varro cited by Velleius Paterculus at 781 years, the duration of the seven previous ages. They added that the eighth age would be followed by a ninth and by a tenth, when (they said) the Etruscan nation would be extinguished.

But to what year does this eighth age of the Etruscan Era answer? Mr. Freret seems to have solved the problem satisfactorily. He remarks that the Etruscan soothsayers, having been consulted concerning some prodigies which had occurred in the first year of the Consulship of Sylla, answered that these prodigies announced the termination of one of the revolutions of the world, and the beginning of a new age—that there had been already eight ages differing in manners, and in the duration of the life of man—that each of these ages formed a great year, and that the Gods gave a signal of the termination of each period by some prodigy in the Heavens or upon Earth.

Suidas says nearly the same thing citing Livy and Diodorus :—he speaks also of eight ages concluded and gives to them the name of Periods or Revolutions of the great year. Hence Mr. Freret concludes that the eighth age of the Etruscans ended in the year 88, before our Era—that supposing the duration of this age to have been equal to the longest of the preceding ones—it would have been of 123 years and the eighth age thus have commenced 211 years before the birth of our Saviour, to which if there be added the 781 years of the previous seven ages we have the year 992 of the Christian Era as the time of the settlement of the Etruscans in Italy. This is 240 years before Rome was founded. Denina (Istoria d'Italia) says that the Etruscan people seem to have been at the height of their power in Italy about four hundred years before the

building of the City; but he does not give his reasons, and tho generally very accurate, he seems here to have been mistaken.

Mr. Niebuhr a German Professor and son of the celebrated traveller of that name, was latterly sent to Italy by the King of Prussia to explore the antiquities of the ancient inhabitants of that Country, and his work has within the last few months appeared here in an English dress. He seems however to have added nothing to the knowledge which we previously had of the Etruscans.

The next great event in the History of this people was the irruption of the Gauls or Celts who passed the Col de Suze under Bellovesus, were met by the Etruscans on the banks of the Tesino where the latter were defeated, and the conquerors settled in the Milanese territory and in Insubria—driving the Etruscans to the north of the Po and taking possession of all their Cities except Mantua.

The Etruscans were first obliged to retreat into Umbria and thence into the territory of Picernum where they established the two towns of Atria and Cupra—the remainder of the nation traversed the Appenine Mountains threw themselves into Campania and formed a state of 12 Cities whereof the town afterwards called Capua was the head. The Samnites by a stratagem of which Livy speaks (Tit. Liv. IV. 37.) obtained possession of this City by surprize 420 years before our Era and 332 years after the foundation of Rome and were driven from the whole of Campania after being in possession of it nearly 400 years.

But of Tuscany they afterwards had only Mantua Atria and Cupra. The Etruscans of Tuscany beyond the Po, and those of Campania seem to have been then separate and independent bodies.

From the foundation of Rome downwards, the history of the Etruscans is to be read in the historians of Rome—The whole of this nation was ultimately extirpated by Sylla, they having joined the party of Marius.

I am not aware of any attempt having been made to explain the import of theword Rasena. *San Son* expressed by the Ionians *Zan*, *Zen Zena* were the original names of the Sun, the great object of antient worship (Bryant's Mythology, 1. 34.)

The word *Rha* is one of great antiquity and was the antient name of the river Volga.—*Rhea* is the most antient of the goddesses. It is found in composition in the following words Rhadamanthus, Rhabduchi, the Greek name for lictors ; Rhama and Rhamna, a village of Attica in which was a celebrated temple of Amphiaraus ; Rhamnus another village of Attica, wherein was to be seen the statue of Nemesis by Agorachritus the scholar of Phidias, which statue Varro esteemed of greater excellence than any other he had ever seen ; Rhapsodi; Rhapton or Rhassta the capital according to Stephanus of inner Ethiopia, inhabited by a nation called Rhapsi ; Rharias one of the names of Ceres—Rhecius a charioteer of Castor and Pollux—Rhenus and Rhodanus the names of the Rhine and Rhone ; Rhamnenses one of the tribes of Rome as established by Romulus. Other examples might be added, but these will probably be thought sufficient. The two words Rha and Sen give us the two first syllables of Rasena. But the Greeks in foreign words continually omitted the Nu final and substituted the *Sigma* which would make of it Rhœ-ses, or Rhœ-sos, thus the swamps which divided Attica from the territory of Eleusinium had the appellative of Rhœsoi—converted by the Latins into Rhaetii.

Plutarch in his Symposiacs introduces the Etruscan Lycias a scholar of Pythogaras, and makes him affirm Pythagoras was a Tuscan, assigning as the reason that certain of the symbols used by the Pythagorians were carefully observed by the Etruscans only.

Alciat has made a collection of the Pythagorian Symbols or precepts, they are as follow :—

No

Ne degustaris ex iis quibus est nigra cauda.
Stateram ne transilias.
Chœnici ne incidias.
Ne cuiuis dextram inieceris.
Arctum annulum ne gestato,
Ignem ne gladio fodito,
Cor ne edito.
Cibum in matellam ne immittas.
Ad finem ubi perueneris, ne retrouertare.
Tollenti onus auxiliare, deponenti nequaquam.
Ollæ vestigium in cinere confunde.
Unguium, criniumq; prœsegmina urina non inspergenda.
Quœ uncis sunt unguibus non nutrienda;
Adversus Solem ne loquitor.
Hirundinem sub eodem tecto ne habeto.
Stragula semper circumuoluta habeto.
In annulo Dei figuram ne gestato.
Sellam oleo ne absterferus.
Coronam ne carpito.
Quœ ceciderunt ne colligito.
A gallo candido abstineas.
Panem ne frangito.
Salem apponito.
Ne libes Diis ex vitibus non amputatis.
Ne sacrificato sine farino.
Adorato circumactus.
Adoraturi sedeant.
Surgens e lecto vestigium corporis confundito.
A piscibus abstineto.

Those mentioned in the passage of Plutarch are the 11th, 13th, 15th, 28th.

There is one other given by Plutarch and which Alciat has omitted—viz. never step over a besom—Alciat has also omitted the golden rule of self examination for which we have the authority of Cicero who tells us that it was disclosed by a scholar of Pythagorus *frementibus condiscipulis*.

The

The following is a translation of it by Dr. Johnson. "Let not sleep, (says Pythagoras,) fall upon thine eye till thou hast thrice reviewed the transactions of the past day. Where have I turned aside from rectitude? What have I been doing? What have I left undone which I ought to have done? Begin thus from the first act and proceed; and in conclusion at the ill which thou has done be troubled, and rejoice at the good."

The inference which the interlocutor in Plutarch draws from similarity of doctrines does not seem to be conclusive. Pythagoras and the Etruscans may have drawn from a common source—and that probably was Chaldean. Pythagoras (whose birth is with great probability fixed at not earlier than the year 600 before the Christian æra by Mr. Freret, Acad. d'insc. et belles Lettres, Vol. XIV.) was perfectly master of the Chaldean as well as of the Egyptian Philosophy and Religion. The Governments which he established were highly aristocratic. But there do not remain sufficient vestiges either of his institutions or of those of the Etruscans, to enable us to compare them as well with each other as with those of the Egyptians and Chaldeans.

The most antient name of the earth is *Ai* and *Aia*. Thus we find the oldest Greek word to be *Gaia*, subsequently *Ge*. The termination *a*. being a contraction of these two words is still preserved in the names of many places as Mesopotamia, *Gallicia*, &c. &c.

The Sun the great object of worship in these antient times is seldom mentioned without an epithet, or some appellative of that supposed deity. What the import of the word Rha is, I dont know and to ascertain it would require a knowledge of oriental letters. *Rasena* then probably imports the land of the Sun with some accompanying epithet or attribute.

There are many reasons to induce us to believe that the t. in Rhœti was pronounced like an S. and then the two first syllables of Rasena correspond with the common name of their Rhœtian ancestors, Let the following passages of Virgil

gil be looked at. Virg. X. 388.—X. 402.—VI. 505—XII. 456.—V. 646.—III. 108.—X. 399.—also the name Rhœsus given by Homer to the Thacian King whose horses Ulisses carried away at the seige of Troy.

It would extend this paper beyond its due limits to support the conjecture which I have formed of the history of the Etruscans previous to their irruption into Italy at the period fixed by Mr. Freret of 1000 years before the Birth of our Saviour. It may be permitted however to state generally that a more minute examination of their history will probably lead us to the conclusion that they came from the antient Thrace, and that in the great displacement of nations which took place at the seige of Troy they were propelled in the interval between these two epochs (an interval of about 186 years) into Italy.

Mr. Niebuhr does not seem to have read Bryant nor to have been acquainted with the original sources of information which he refers to, when he excludes so dogmatically the name of Tyrhenians without condescending to assign any reason for the exclusion of one of the names by which they seem to have been known throughout the whole of antiquity.

There is a number of monuments and of inscriptions in the Etruscan tongue, published by the learned men of Italy—Of these inscriptions Mr. Freret again informs us some are in Latin others in Etruscan Letters. These latter are the in ancient letters conveyed into Greece and Iberia by the Phenicians, and are still to be found on the ancient Spanish coins. They resemble, as published by Count Lastanosa much the Samaritan Letters but have little likeness to the letters seen upon the medals of Tyre, Sidon and Cadiz.

Those in Latin letters are as unintelligible as the others—and all the researches into lheir meaning have hitherto in a great degree failed. Still, Mr. Neibuhr is in an error when he says in a note to his chapter upon the ancient Etruscans, that there are only two words of this tongue, the import of which is known.

There

There is a third Etruscan word preserved to us by Dyonisius of Halicarnasssus. It is the word *Tursis*, which that writer informs us was adopted by the Greeks from the Etruscans and signifies a large Tower—such as was used by the Etruscans and copied from this people by the Greeks. From the Etruscans the Romans changed the first *s* to *r*—hence *Turris*. Whether our word *Tower*, and the French word *Tour* is derived from the Latin, or rather not derived directly from the ancient *Tor*—which is the probable root of the Etruscan *Tursis* may be doubted. It is proper to observe, that the Greek word *Tursis* has no Greek root.

Bryant has the following observations upon the word *Tor*.

"Tor is an hill or Tower. Many places in Greece had it in their composition; such as Torone, Torete, Toreate: also in Hetruria, Torchonium. Turzon in Africa was a Tower of the Sun. It was sometimes expressed Tar, hence Tarcunia, Taracena, Tarracon in Spain, Tarne (Tar-ain) which gave name to a fountain in Lydia; Taron (Tar-on) in Mauritania. Towers of old were either Prutaneia, or light houses, and were styled Tor-Is: whence came the Turris of the Romans. Sometimes these terms were reversed and the Tower was called Astur. Such a one was near some hot streams at no great distance from Cicero's villa. The river too was called Artura. There was also a place of this name opposite to the island Lesbos, undoubtedly denominated from the like circumstances in its situation, as may be learned from Pausanias, who had seen it."

But besides this there are other words having an evident affinity to words still found in the Latin authors. This will perhaps best be shewn by copying here an Etruscan Inscription to be found in the Miscellanea Antiq. Erud. of Spon.

LERPIRIOR. SANTIRPIOR. DVIR. FOR.
FOVFER. DERTIER. DIERIR. VOTIR. FARER.
VEF. NARATV. VEF. PONI. SIRTIR.

It is proper to observe that the religion of the ancient nations of Italy seems to have been the same and to have differed

fered much from that of the Greeks. In the knowledge of the religion of Italy, the Etruscans possessed an acknowledged pre-eminence. It was intimately connected with the civil forms of Law and Government—nay with all the principal acts of private life. The Romans derived their forms from the Etruscans. It is in these forms that we are to look for the almost unchangeable *verba solennia* thus adopted by the Romans. Now several of these *verba solennia*, are to be found in the above inscription, and I apprehend that it must have been a Votive tablet.

These were very common amongst the ancient Romans as well on public as upon private occasions. The poets often allude to this.

> Me *Tabula* sacer
> *Votiva* paries indicat uvide
> Suspendisse potenti
> Vestimenta Maris Deo.
>
> Horat. Carm. I. 5.

Again,

> Votiva, pateat, veluti descripta tabella
> Vita senis. Horat. Serm. II. 1.

And Tibullus,

> Pendebatque vagi pastoris votum
> Garrula silvestri fistula sacra Deo.
>
> Lib. II. El. 3.

Authorities might be multiplied from the Latin poets and historians.

The word *Voveo* was in the ancient Roman Ecclesiastical law a *verbnm solenne*. It will be found in the vow of Romulus of a temple to Jupiter Stator. Livy I.—of Appius, Livy X.—of Camillus, Livy V.—and it as well as the word *Votum* are found in a multitude of other places. Brissonius expressly says, *sed jam ad votorum formulas transeamus, in quibus solemne fuisse verbum voveo non est ignotum*,—Brison. de Form. 105.

The

The word *Votum* is to be found also in conjunction with another word which we see in this inscription, the word DUIR, which is the same as the Latin word *Dare*, which is eminently a *Verbum Solemne* being one of the *Tria verba* (Do Dico Dedico) referred to in Ovids Fasta.

Ille ne fastus erit per quem tria verba silentur.
Fastus erit per quem lege licebit agi.—Ovid. Fast. lib. 1.

After the defeat of the Consul Flaminius, by Hannibal at Lake Thrasymine the Decemvirs according to Livy, made the public Vow of a *Ver sacrum, si bellatum prospere essit, resque publica in eodem quo ante bellum fuisset statu permansisset.* In the rogation of the Law to carry this into effect, the following words will be found *donum duit*—where this word evidently stands for *dat.*

The same word is found in the vow made by Appius, *inter prima Signa,* with his hands lifted to Heaven, as was the form: *Bellona hodie nobis si Victoriam Duis, ast ego templum tibi voveo.*

A compound of this root is to be found in the fourth table of the 12 tables, (Gothof. 4 fontes &c.) *Si pater familias ter filium venum duit liber esto.*

The word *farer* is probably the same word as *fari* which is a *verbum solenne.* It is also probable that the terminations *er* and *ier* are terminations of the infinitive mood in the ancient Etruscan tongue. *Fasti* sunt quibus licet *fari* prœtori tria verba solemnia Do Dico Dedico.——Macrob. Saturnal I. 16.

I am led to suppose that this may be an Etruscan termination of the infinitive—for the following reasons. It is more ancient than the common Latin termination of *re.* We meet with it in some of the ancient forms as in the word *Agier* for *Agere.* Lucretius who was fond of old locutions uses it frequently as also does Persius; and Horace more sparingly than either, following the rule which he expresses so well,

Obscurata diu populus bonus eruet atque
Proferet in lucem speciosa vocabula rerum
Quæ priscis memorata Catonibus atque Cethegis
Nunc situs informis premit et deserta vetustas.
Epist. II. 2.

Ponere is a verbum solenne, and there can I think, be no doubt, that the word *Poni* in the inscription is used in the sense of the Latin word. Its being used here, serves also further to confirm the conjecture, that the inscription was one of a votive tablet.

Non ego victrices lauro redimere *Tabellas*
Et Veneris media *Ponere* in aede morer.
Subscribam, Veneri fidas tibi Naso *tabellas*
Dedicat. Ovid. Amor. I. 11.

So also Propertius,

Magna ego dona, tua figam Cytherea columna
Taleque sub nostro munere carmen erit;
Has *pono* ante tuam tibi Diva Propertius Ædem
Exuvias tota nocte receptus amans.
El. 11.

All the ancient inscriptions upon stones abound with the words Donum Dedit, or Donum Posuit, but more frequently with the initials of these words D. D. or D. P.

The word *naratu*—may be the supine of the word *narro*. I conjecture that the two first words of this inscription are compound words—*Lar* or *Lars* or *Larts* is an Etruscan word, and signified in that language *Dominus*. At least so it is said in the Viaggie di Platone nell'Italia dal Signor Cuoco; and tho' he does not cite his authority, yet he could not have been mistaken upon a point like this.

The Romans confined this term to their household Gods. But they were in the habit of prefixing the words Dominus and Domina to the names of their other Gods and Godesses.

Ovid gives them this epithet in the 11th Elegy of the 3d book Amor. Petronius Arbiter (Satyr.) says, *Timidissimo murmure votum feci et Domina inquam Venus.*

So

So also Virgil,

Junoni cane vota lubens Dominam que potentem
Supplicibus supera donis. Æneid III. 438.

And again speaking of the mother of the Gods.

Et vincti currum *Dominae* subiere leones.

Virgil in the sixth book of the Æneid gives the title to Proserpine. It may then be here a title.

Upon the concluding syllable of this first word we shall find all the information we require in Bryant. He says that Aur, sometimes expressed Or, Ur, and Our, signifies both light and fire. "Hence came the Orus of the Egyptians, a title given to the Sun. Quod solem vertimus, id in Hebræo est Ur; quod lucem, et ignem, etiam et Solem denotat. It is often compounded with the term above, and rendered Abor, Aborus, Aborras; and it is otherwise diversified. This title was often given to Chus by his descendants whom they stiled Chusorus. From Aur, taken as an element, came Uro, Ardeo; as a Deity, oro, hora. Zeus was stiled Cham-Ur, by the Greeks; and under this title was worshipped at Halicarnassus. He is so called by Lycophron."

Sant in the next word seems to be an epithet. *Sanctus* is a *verbum solemne*, and was often applied by the Romans as an epithet to their Gods. The following are examples.

Sequimur Sancte Deorum,
Quisquis es.————————Vilgil Æneid. IV. 576,
Et cantant laudes Termine sancte tuas.
Ovid Fastor II.

Examples of this application of the word Sanctus might be multiplied. It is very frequently found so applied in ancient iascriptions.

Bryant enables us also to understand the concluding syllable of this word. "To the prefixes pi and phi is generally joined er by which the element of fire is denoted. They called their chief God Pur: and dealt particularly in divination by lots, termed of old *Purim*. Cicero takes notice

tice of this custom of divination at Præneste; and describes the manner, as well as the place: but gives into the common mistake, that the Purim related to Jupiter's childhood. He says, that the place, where the process was carried on, was a sacred inclosure, is est hodie locus septus religiose propter Jovis *Pueri*, qui lactens cum Junone in gremio *Fortunae* mammam appetens, castissime colitur a Matribus. This manner of divination was of Chaldaïc original, and brought from Babylonia to Præneste. It is mentioned in Esther, c. 3. v. 7. They cast Pur before Haman, that he might know the success of his purposes against the Jews. *Wherefore they call those days Purim after the name of Pur.* c. 9. v. 26. The same lots of divination being used at Præneste was the occasion of the God being called Jupiter Pur. This in aftertimes was changed to Puer: whence we find inscriptions, which mention him under that name; and at the same time take notice of the custom which prevailed in his temple. Inscriptions Jovi Puero, and Fortunæ Primigeniæ Jovis Pueri are to be found in Gruter. One is very particular.

Fortunæ Primigeniæ Jovis Pueri D. D,
Ex SORTE compos factus
Nothus Ruficanæ
L. P. Plottilla,

That this word Puer was originally Pur may be proved from a well known passage in Lucretius:

Puri sæpe locum propter ac dolia curva
Somno devincti credunt se attollere vestem.

Many instances, were it necessary, might be brought to this purpose. It was a name originally given to the priests of the Deity who were named from the Chaldaic, Ur: and by the ancient Latins were called P'uri. At Præneste the name was particularly kept up on account of this divination by lots. These by the Amonians were styled Purim, being attended with ceremonies by fire; and supposed to be effected through the influence of the Deity. Præneste seems to be a compound of Pur-n Esta, the lots of Esta, the Deity of fire."

The

The names of all the Etruscan Gods given by Varro, have roots which are still found in the Latin language as Vertumnus Volumnus et Nolumnia et Nurtia &c. This is sufficiently accounted for by the number of Etruscan emigrants who settled in Rome soon after its foundation and the great number of other Etruscans, who afterwards removed to Rome

It may be that the discovery made within a few years past of the ancient Egyptian characters and language may be soon followed by the discovery of the language of ths Etruscans, which would open a rich mine of archœological lore.

It has already been observed that whilst the Etruscans occupied the centre of Italy, kindred tribes speaking the same language, inhabited the Rhetian Alps. And as some years ago there was found in a retired valley of the mountains in the neighborhood of Verona, a colony speaking pure Saxon German, whom scholars like Maffei and Denina, declared to be descendants of the Cimbri who were defeated by Marius, it would seem probable that there might still be found in the Tyrol, Colonies speaking the Etruscan tongue.

Latterly there has been a Colony found living in the village of Groeden, in the Tyrol, who speak a language the roots of which are altogether different from any known tongue, and which has been conjectured to be the Etrascan. It is highly probable that this conjecture is true, and if so then it will be our lot to have lived to see a discovery but little inferior in importance, and certainly as little looked for as that of the Hyroglphics of Egypt.

Art. IX.—*Notes on the Country in the neighbourhood of the falls of Montmorency, by William Green Esquire.*

The bed of the Saint Lawrence appears to be here composed of Clay Slate, or of that Rock and Grey wacke alternating with each other.

The

The amphitheatric Section in the middle of which are the Falls of Montmorenci appears to consist at both its outer (or southern) ends of a shaly rock exhibiting a broken stratification dipping to the south inclined at an angle of 43°. as represented in No. 2, and at its northern ends abutted on gneiss which emerges from beneath the bed of the Saint Lawrence.

The gneiss supports a mass of limestone, in some parts more, in others rather less than fifty feet in thickness, stratified horizontally,

A Section of this mass bearing northerwards with a sinuous course contains the River Montmorenci. This stream is reported to be from its source to its mouth a torrent, and is ascertained to be so in many miles of the southern portion of its course. It enters the St, Lawrence at Montmorenci, there forming the well known Cataract of that name. At low water in the St. Lawrence, these falls are two hundred and twenty-eight feet high,

At a point north of the Bridge and within thirty yards of it, on the east bank of the Montmorenci, at the level of high water there, one horizontal bed of conglomerate a foot thick rests immediately upon the gneiss and immediately under the limestone. It contains pieces of white and of bluish white translucent opaline stones, rounded and varying in size from that of a duck-shot to that of a bean. This bed is parallel to the limestone, and bears to the strata of gneiss the relative direction represented in No. 5.

At another point South of the Bridge, on the West Bank, diagonally opposite to the situation last described and distant from it about 100 yards at the level of high water in the Montmorenci there appears the edge of a bed of Rock, similar in aspect,

* To those who know the place, it need not be said that the tide has no influence in the Montmorenci.

aspect, and also in position, (relatively to the river and to the gneiss,) to the conglomerate already mentioned—but differing from it in position relatively to the incumbent limestone in this—that between the [supposed] conglomerate now mentioned and the superior limestone, and in immediate contact with both, gneiss appears—gneiss being also beneath this [supposed] conglomerate, in horizontal continuation of that surface which is the bed of the river—whereas in the case first mentioned, gneiss is under, *not above* the bed of conglomerate.

In the present nearly vertical state of the cliff it is not practicable to descend sufficiently near the subject of inquiry to ascertain whether the masses of gneiss which are above the conglomerate be peaks of their main rock protruding through the conglomerate, or whether they be boulders. If the latter, their situation is peculiar in this—that they are imbedded in the limestone and project through its main mass and not through its *Débris*. The subjacent conglomerate, from its aspect and the conformity of its position to that of the opposite conglomerate, would appear to have been a portion of the same bed, as much as the opposite strata of limestone now divided by the Montmorenci seem to have been formerly united—as much also as the opposite shaly banks which form the ends of the curve that includes the fall and are now separated by a bay of the Saint Lawrence, seem to have been once connected.

These masses of gneiss are represented in No. 4, at the letters a. a. a. The summit of the limestone is covered with a diluvial deposit containing throughout its mass and scattered over its surface boulders of granite, gneiss and quartz. On both sides of the river are found grape shot and other projectiles; vestiges of the military operations conducted near these falls by Wolfe and Montcalm.

The sand of the Montmorenci is large grained and angular with fine grained rounded black iron sand in small proportion,

mixed with a very little of an equally fine grained rounded sand, translucent, of a pale red colour. The latter notwithstanding its superior specific gravity, is always washed higher upon the shore than the other and is deposited upon it—and this occurs elsewhere. Mortar made of Beauport lime and these sands becomes extremely hard. That used in building Haldimand house at this place forty five years ago affords proof of this.

The soil is brown of a middle tint relatively to the degrees of intensity of that colour. It is sandy here and there, and occasionally marshy;—on the whole not remarkable either for barrenness or fertility, but sufficiently rewarding the toil of its cultivators. In the woods the pine in several of its species prevails; yet it is intermixed with that variety of other trees which is supposed to indicate a good soil. From the summit of the cliffs of lime upon gneiss represented in No. 3, it is obvious with respect to trees growing on the summit and on the lower points, that vegetation is most luxuriant at the higher levels where their roots may feel the influence of the lime—and that in stature they diminish progressively as they occupy lower stations where they grow out of fissures in gneiss and recede from lime. Not only do they diminish in stature, but the number of their kinds likewise decreases. The species which is most persistent appears to be a stunted black spruce—and at the lower points of the line of vegetation here that spruce is not accompanied by any other tree. This progressive deterioration appears confined to the gneiss cliffs. (see No. 2. A.); those which are shaly being, where not too nearly vertical for the attachment of roots, clothed from their summit to their base with a vegetation equally vigorous throughout. The decrease of vegetation above mentioned occurs, notwithstanding the constant presence of vapour from spray and from the adjacent extensive sheets of water, in addition to the common supply of rain.

The

The limestone passes into sandstone on the east of the falls within a hundred yards of them, and it is said it there terminates. At the point B. (in No. 2.) where there is a lime kiln within that distance, the limestone, (although still retaining that name,) is considered as not fit for the kiln, which is supplied with a better material from other parts of the same field nearer the Falls.

The principal extent of the limestone, is to the west of the Falls; and at its western limit, it joins clay-slate. To the north it is interrupted by a chain of mountains of gneiss which appears to emerge from beneath it, and to be part of the rock over which tho Montmorenci rushes. So much of these mountains as is visible from Quebec, forms a ridge of which the general bearing from that place is through all the points between N. W. and N. E. The lower summits are the north western, and the more elevated are at the N. E. The loftiest ascertained point in this tract anpears to be that of Cape Tourmente, 2000 feet above the St. Lawrence where it flows along the base of that mountain. This chain encircles many lakes and fertile vallies: yet its northern series is imperfectly known to the European race. It continues to be the hunting ground of the Hurons of Lorette. Along the hither, or southern line of their base—and not higher, so far as is known—the soil contains imbedded shells, among which those of this form and size are the most common. (see fig. 7. a.) This is also true of other parts of Beauport and of Charlesbourg and Lorette. Through those parishes (adjacent to each other) the limestone formation continues. At the west of Beauport it recedes from the course of the St. Lawrence skirting the southern line of the base of the mountans before mentioned through those parishes, and thence declining to the level of the Saint Lawrence which it meets at Jacques Cartier in Cap Santé near a place where the river Jacques Cartier rushes through a narrow gorge in that rock. In this tract the Limestone has continued through every level from that of the

St: Lawrence at Jacques Cartier to three hundred feet and more above the level of the same river at Beauport, an interval of 40 miles. In that distance the declivity of the bed of the St. Lawrence towards the east is supposed to be feet. This declivity is in a direction opposite to that of the land adjacent to the St. Lawrence, which in that space is higher on both sides of the river towards the east and lower towards the west.

The Beauport Limestone contains petroleum, mineral caoutchouc or elastic bitumen and numerous organic remains of marine animals of several kinds. Among these are many of this form No. 7, some of which are more than a foot long. The cavities of these often contain or are filled with quartz which is sometimes white and opaque, sometimes translucent but smoky. The crystals adhere to the circumference, whence they converge—and when there is a cavity, the deficiency of matter is at and next the centre.

This Limestone, by friction or percussion becomes temporarily fetid. Burnt, it is often of a pale green hue, and in the state of quick lime it is seldom perfectly white, but becomes so on being slaked. The colour of the stone is dark grey, which weathering renders superficially much paler. Distinct lithographic impressions have been taken from it, but the darkness of its colour diminishes its utility by rendering obscure to the artist and the printer the effect of their work during the process, especially while the stone is wet.—It is probable that in the numerous cases where *red* (instead of black,) ink might be used, as that colour would contrast sufficiently with the hue of the stone, this objection would disappear, and the stone become useful in this art. Many portions of it are very compact and fine grained, free from veins, spots and visible organic remains. Thin plates of these are sonorous when struck. The fracture of this Limestone is conchoidal.

When

When the St. Lawrence is frozen below the Falls, the level ice becomes a support on which the freezing spray descends as sleet. It there remains and gradually enlarges its base and its height, assuming an irregularly conical form. Its dimensions thus continually enlarging, become, towards the close of winter, stupendous. Its utmost height in each season necessarily varies much, as the quantity of the spray it is formed of depends upon the degree in which the water producing that spray is copious. It has not been observed higher than 126 feet, which altitude it attained in March 1829. The whole of the preceding season had been unusually humid. The face of the cone next the Fall presents a stalactitical structure not apparent elsewhere; and there occasioned by the dashing of water against it, which freezing in its descent, assumes the form which characterizes it under such circumstances. The whole cone is slightly, yet very perceptibly tinged of an earthy hue, which it can only have derived from infinitely comminuted particles of the bed of the Montmorenci abraded by the torrent, and conveyed into the atmosphere with the spray.

The formation of this cone may suggest some explanation of the mode in which Glaciers have been formed.

It is manifest that were the supply of frozen spray never interrupted, as it annually is, by an increase of temperature, it would be incessant—and the dimensions of the cone would constantly increase. It is also plain that if the cone instead of resting on its horizontal base were supported by an inclined plane, its encreasing weight and enlarging bulk would at length urge its descent to lower levels. The part thus deposited, would by the like process receive continual accessions from above, and having thus acquired permanence, (as a frozen mass apparently undiminishing, because continually renewed,) our cone would thus have become a glacier.—Now, on lofty mountains, the vapours which are congealed within the region of perpetual frost, are by those summits continually

continually attracted thither, and there congealed and accumulated—the inclined planes on which they alight, become at length inadequate to the support of their mass and weight, they descend to lower levels—they occupy the vale below, whence they never are removed, being incessantly renewed from the same permanent source of supply, by the same unalterable process, as rapidly as any portion of them yields to the temperature below; or even more rapidly in cases where they are observed to be encreasing.

Art. X.—*Mrs. Sheppard of Woodfield on the recent shells which characterise Quebec and its environs.*

At the earnest solicitation of a member of the Society of Arts and Sciences,* I have endeavoured to compile a list of such few shells, inhabiting the grounds and waters in the neighbourhood of Quebec, as have come within my observation:

In making this list the system of De Lamarck has been followed; it contains perhaps but a small proportion of the Shells which may yet be found by more vigilant searchers; but imperfect as is is, it possibly may have some interest with the Society, if it be but to induce others to prosecute this interesting branch of natural history.

De Lamarck considers Conchology as part of the main body of Zoology; he begins with Infusoria, and goes regularly step, by step, up the ladder of life, which he divides into animals invertibrate and vertibrate; he has placed those animals with a testacious covering, in the ninth, tenth, eleventh and twelfth Classes of his "Animeaux sans vertébres."

* To the writer of which a silver medal was adjudged. This article was kindly communicated by the society to which it was presented, to the Literary and Historical Society,

Class the ninth, ANNULATA.

The two first orders have animals without shells (we have a few of those.) Testaceous animals commence in De Lamarcks third order.

ANNULATA *SEDENTARIA*.

AMPHITRITEA, third family.

Sabellaria.

"Tubes many, composed of sand and fragments of shells aggregated into a common mass."

"Animal Subcylindrical, with three rows on each side of shining paleæ, mouth fissure shaped placed below the exterior palea."

Sabellaria——? "Tubes brittle, summits jagged, orifices large rather angular.

This shell is met with about 100 miles below Quebec, covering other shells &c. Of the species I am uncertain, De Lamarck says there are several, he describes but two; this does not appear to be either of them. The tubes are very loosely cemented together, white, thin and, semitranslucent.

In the tenth class CIRRIPEDA, none have as yet been discovered here, nor do I know whether any of them inhabit this country, there probably may be some in, or near the gulf.

The eleventh class affords us several genera.

First order CONCHIFERA *BIMUSCULOSA*.

SOLENACEA, third family.

The following genus inhabits Rimouski, but having only met with an imperfect specimen, the species could not be fixed.

Solen. Shell bivalve, equivalve, elongated, gaping at both ends, beaks small, cardinal teeth small, sometimes none, ligament external near the hinge.

MYACEA, fourth family.

Mya. "Shell gaping at both ends, ligament short, internal; one large perpendicular tooth on one valve, a pit on the other.

Animal

Animal with a compressed thick foot at one extremity, at the other sending forth a large tube."

These shells are readily distinguished from Unio, which Linnœus had placed in the same genus, by their broad perpendicular tooth.

Mya arenaria. "Shell ovate, anterior side rounded, cardinal tooth denticulated :" inhabits near the mouth of this river—the large tooth is very sharp at the summit, the shell is of a whitish colour tinged with yellow or red.

CONCHE, ninth family.

Venus. "Shell equivalve, inequilateral, transverse or orbicular, three cardinal teeth on each valve, aproximate at their base, lateral ones spreading obliquely open towards the summit, ligament external."

"The animal is possessed of two tubes which it often sends out beyond the shell."

Venus mercenaria. "Shell solid obliquely cordate, transversely striate, and sulcate; within white, with a large violet spot on the anterior side." This species is sometimes brought up with oysters from the gulf; it is a course heavy shell of a grayish colour, not in the least pretty, although belonging to the most beautiful family of the Conchifera.

NAIADA thirteenth family.

As the Naiada are all river shells, it is probable there may be several of them indegenous.

Unio. "Shell transverse, equivalve, inequilateral; beaks decorticated, hinge with two teeth on each valve, one cardinal short, mostly lobed, or bifid, substriated; the other elongated compressed; lateral extending under the corselet, along the lower margin :" this genus formed by Bruguier out of some of the Linnæan Myas, is by DeLanarck removed several families from them.

These shells as DeLanarck observes, run one into the other to such a degree, that the species are rendered very uncertain.

We

We have three different ones here, perhaps unio sinuata, radiata and nanca; but it is almost impossible to decide without figures, or very elaborate descriptions, neither of which are to be had; could either be met with, the species of this intricate genus might perhaps be decided upon with some degree of certainty. Swainson asserts, in his "Zoological Illustrations" that the species cannot be fixed without both.

Unio sinuata, "shell ovate, oblong, compressed, sinuous; on the upper part thick, cardinal tooth lobed, and striated." Inhabits the Island of Orleans, not very common. I have sometimes found very small pearls in this species; it is a coarse large mother of pearl shell with a brown epidermis.

Unio radiata, "shell obovate, convex, rather depressed, thin, transversely striated, broader on the anterior side than on the other; epidermis yellow, longitudinally rayed."

Found on the beach at the Island of Orleans; the shell is much thicker than those from Saratoga, and is pink or flesh colour within.

Unio nanca, "shell transversely oblong, beaks depressed, lateral; tooth deeply canaliculated."

This species, much more common than either of the foregoing is likewise an inhabitant of the Island of Orleans; the shell is violet or clay colour within, and is rarely rayed, it is much lengthened the transverse way, and covered with a black or dark brown epidermis, under which is mother of pearl.

SECOND ORDER, UNIMUSCULOSA.

MYTELACEA, SECOND FAMILY.

Two of these are common in the salt water of this river.

Modiola.

Shell subtransverse, equivalve, regular, posterior side very short, beaks almost lateral, depressed on the short side.—Hinge without teeth, lateral, linear; legament cardinal, al-

 most

most wholly internal; one sublateral, muscular, elongated impression, axe shaped."

Modiola plicatula, "shell oblong, towards the outside obliquely dilated; longitudinally sulcated; inside edge waved."

Common near the Gulf, likewise met with higher up the river; the shell is white, covered with a brown, or yellow epidermis.

Mytelus.

"Shell longitudinal, equivalve, regular, pointed at the base, fixed by a byssus; beaks almost strait, terminal pointed.—Hinge lateral, usually without teeth, ligament marginal, subinternal. One large clavate muscular impression."

The Modiolæ formerly belonged to this genus, but were removed from it by Bruguiere.

Mytelus borealis, "Shell oblong, whitish blue, epidermis black, beaks incumbent divaricate." Inhabits several parts of the St. Lawrence: the shell is of a solid and flinty texture; the beaks rather one sided. There is likewise a variety of this species found below Quebec, more pearly and sometimes obsoletely rayed, with the inside white and shining: both these shells are often brought up with Oysters.

OSTRACEA, FIFTH FAMILY:

Few of this family are to be met with here, the only one which has come within my observation is the well known

Ostrea.

"Shell adhering, inequivalve, irregular; beaks distant, becoming very unequal by age. Hinge without teeth; ligament internal, or partly so. Pit and beaks of the lower valve increasing by age, sometimes to a great length." The animals remain fixed to maritime bodies, and have no other motion than that of opening and shutting their valves to receive whatever nourishment the waters may bring them.

Ostrea canadensis, "shell elongated rather bent, broadish above, lamelated, thick, inferior valve convex." Inhabits the mouth of this river, sometimes grows to the length of eight inches.

TWELFTH

TWELFTH CLASS MULLUSCA.

SECOND ORDER GASTEROPODA.

CALYPTRACIANA, FOURTH FAMILY.

Crepidula.

"Shell oblong, concave within, spire very much inclined towards the margin; aperture partly closed by an horizontal lamina."

"Animal, head forked anteriorly, two conical tentacula, with eyes at their base, mouth simple without jaws, foot very small."

Crepidula fornicata. "Shell oval, posteriorly obliquely curved; posterior lip concave."

This species inhabits the Gulf; is frequently brought up with oysters—the shell is shaped like a little *sabot*, it is of a gray colour, often streaked with brown; within shining, and marbled with chesnut, the lamina is white, thin and semitransparent.

Third Order *TRACHELIPODA.*

COLEMACEA, Fifth Family.

Three of these are common here; they are land animals.

Helix.

"Shell orbicular, convex, or conoidal; spire very little elevated; aperture entire, wider than long, oblique and near the axis of the shell; margins disunited by the projection of the penultimate whorl."

The animals live on vegetables, and remain dormant during the winter.

There are two species about Quebec; they do not appear to be among those described in "Les Animaux sans vertébres;" but the species being so numerous, and De Lamarck having only described those in his cabinet, render it uncertain whether they may be new or not. The first, perhaps a variety of

Helix hortensis. "Shell imperforate; spire flat; epidermis yellow whitish; whorl transversely striated; lip

within white, margins reflected." Found on the bank near the plains of Abraham. Common in spring.

Helix————? Shell thin, conoidal, perforated; spire very flat; margin of the lip reflected.

Common in the same place with the above; it is a much less shell, with a brown epidermis; the penultimate whorl has an elevated white ridge near the aperture, which appears to be some remains of the last year's lip.

Corocolla.

"Shell orbicular, rather convex, or conoidal; on the upper part, with a sharp angular periphery. Aperture transverse, contiguous to the axis of the shell, right lip subangular, often toothed on the lower part."

De Lamarck formed this genus merely to reduce the number of species in that of Helix: they are, however, rather too closely allied. The species we have here, seems to be a connecting link; but De Lamarck, would, I think, range it under corocolla, and until it be ascertained to have been previously described might be called

Corocolla dubia. Shell orbicular, largely umbelicate; spire flat, whorls transversely striated, horn colour, spotted with brown. Common in the spring on the bank with the two foregoing shells; it is rather a pretty shell, often variegated with white and brown.

Succinea.

"Shell ovate, conical; aperture capacious; right margin sharp, not reflected, united at the lower part to a smooth acute columella. The animals have four tentacula, two of which have eyes on their summit." They inhabit land but are generally found near water.

Succinea amphibia, "shell ovate, thin, pellucid, yellowish; spire short, dilated at the lower part, subvertical." Inhabits gardens on the St. Louis road; it is horn coloured, and very transparent.

LYMNÆANA

LYMNÆANA, Second Family.

There are some species here of all the genera belonging to this family.

Planorbis,

"Shell discoidal, all the whorls visible on both sides; aperture distant from the axis of the shell; margins not reflected. They are fresh water animals, have two tentacula with eyes at their base."

Planorbis spirorbis, "one side flat, the other subumbelicated, reverse; horn coloured."

Found in abundance in the water near Etchemin.

Planorbis alba? "Shell umbelicated on both sides; upper part of whorls flat, lower convex; aperture wide and angular."

Found with the foregoing, but not so common, it is the Helix alba of Linnæus, but is not among DeLamarcks species.

Physa.

"Shell convolute, oval or oblong; spire projecting; aperture longitudinal, contracted above; columella twisted, right margin acute projecting beyond the plane of the aperture."

They are fresh water animals; have two flattened tentacula with two eyes at their base.

"Physa fontfnalis, reverse, oval, transparent smooth, horn coloured: spire short, subacute."

Not very common, but is sometimes met with on the beach at the Island of Orleans.

Physa subopaca. "Shell reverse, oval, semipellucid, grayish yellow; spire short, acute."

This species is rather more common than the foregoing, they are often found together at the Island; it resembles fontenalis, but is not so transparent. It is yellow without, and white within.

The third and last genus of this family is

Lymnæa

Lymnæa.

"Shell oblong, often turrited, generally thin; spire projecting, aperture entire, longitudinal; margin sharp; columella twisted obliquely, with the lip passing over it, forming a very oblique fold."

These animals inhabit swampy ground or fresh water.

Lymnæa stagnalis. "Shell acute, ovate, ventricose, thin, transparent, longitudinally substriated, reddish gray; last whorl subangular above; spire subulate; aperture large; lip broad." Found abundantly at Sorel. The spire is often black and very long; lower part of the shell generally horn coloured.

Lymnæa palustris. "Shell ovate, oblong, longitudinally, and finely striated; spire conical, rather acute, aperture ovate."

Found in ponds formed by the melted snow in the spring, near Tower No. 1. This shell is not so large or thin as stagnalis; it is generally ash coloured.

Peristomiana, Fourth Family.

Paludina.

"Shell conoidal, whorls rounded or convex, modifying the spiral cavity; aperture longitudinal, angular at the summit; the two margins united, acute, never turned out." Some of these animals inhabit the sea or mouths of rivers, but the greater part live in fresh water. There are two species here, neither of them, I think, described by De Lamarck: they are both small shells.

Paludina———? Shell white; epidermis olive; spire the length of the aperture; last whorl inflated.

Inhabits the Island of Orleans.

Paludina ———? Shell pale buff; spire longer than the aperture; top obtuse.

Found with the foregoing on the beach at the Island: the whorls are not so much inflated as those of this genus generally

rally are, but I think it would not range under any other: it has bluish bands of gray round the top of the whorls.

NERITACEA, Fifth Family.

Natica.

"Shell subglobular umbilicated; aperture entire semicircular; left lip oblique, not crenate, callous; umbilicus often covered by the callus."

Natica magdalena. Shell nearly orbicular, smooth, finely striated, grayish white; spire black; callus obsolete. Inhabits the Magdalen Islands: this species is not among De Lamarck's: neither is it described in any book of reference, that I have had an opportunity of seeing: it may be a new species, and is here designated as above, merely from its having been found in those islands.

PURPURIFERA, 13th Family.

The animals of this family, De Lamarck informs us, secrete that colouring matter which formed the beautiful purple of the Romans; it prevails most in the genus Purpura.

Buccinum.

"Shell oval, conical, aperture longitudinal, with a notch at the base, but no canal; columella not flattened, turgid at the upper part."

These animals inhabit the sea shore; they are not in general large: the following species is one of the largest; about two inches long, it is not described by De Lamarck,

Buccinum ————? Shell oval, inflated, longitudinally ribbed; ribs sometimes obsolete; apperture grayish purple.

Inhabits Bic, generally surrounded with scarcely perceptible striæ, and has a chalky appearance, but not unfrequently the latter is wanting, or as if it were rubbed off, allowing large brown and blue nebnlous spots to appear: sometimes the shell is of a yellowish colour, with the transverse striæ distinctly visible; the apperture varies from purple to yellow and white.

I have no where met with a description which would identify this, or the next species, but as they are not rare, they probably may have been named.

Buccinum————? Shell oval conical, white, transversely sulcated; spire tipped with brown; apperture pink or reddish purple.

Inhabits the Magdalen Islands, not so large as the foregoing, but much heavier: the shell is of a more solid and flinty texture.

It is to be regretted that no book of reference has yet made its appearance here, comprising every species. Without a complete nomenclature it is impossible to determine whether a shell be new or not: several are met with which do not accord with any mentioned in the books we have; altho' perhaps they may be described elsewhere.

De Lamarck's work is quite satisfactory with regard to the genera, but as he only gives a part of each genus, I have, (as is apparent) been frequently at a loss respecting the species.

Art. XI.—*Journey across the continent of North America by an Indian Chief, about the middle of the last century, as taken from his own mouth, and reduced to writing by M. Le Page du Pratz, communicated by Andrew Stuart, Esquire.*

It has often been conjectured that North America was originally peopled from Tartary, and that the Tartars entered this continent by the way of Kamscatka. There are many reasons for believing that the new continent as well as the old has been peopled by different races at different times; and that the last great change which took place was produced by

a

a great Tartar invasion similar to that which under Gengis-Khan devastated the Chinese Empire, and of that too which overwhelmed the Roman Empire. The exterminating character of the Tartars is well known, and it is probable that the whole of the race which built the forts, the vestiges of which are found between Lake Ontario, and the Gulf of Mexico was utterly destroyed by these Tartar invaders, whose descendants we now see in the aboriginal red men of this continent.

I do not mean here to enter upon the grounds and reasons upon which this opinion rests, but beg leave to lay before the society some facts relating to this subject, that seemed to me to be of interest, to be found in a work not so generally known as it deserves to be; this is the history of Louisiana, by M. Le Page Du Pratz who gives the following account of the peopling of America.

When the *Natches* retired to this part of *America*, where I saw them, they there found several nations, or rather the remains of several nations, some on the east, others on the west of the *Mississipi*. These are the people who are distinguished among the natives by the name of *Red Men*; and their origin is so much the more obscure, as they have not so distinct a tradition as the *Natches*, nor arts and sciences like the *Mexicans*, from whence we might draw some satisfactory inferences. All that I could learn from them was, that they came from between the north and the sun-setting; and this account they uniformly adhered to whenever they gave any account of their origin. This lame tradition no ways satisfying the desire I had to be informed on this point, I made great inquiries to know if there was any wise old man among the neighbouring nations, who could give me further intelligence about the origin of the natives. I was happy enough to discover one, named *Moneacht-apé* among the *Yazous*, a nation about forty leagues north from the

Natches. This man was remarkable for his solid understanding and elevation of sentiments; and I may justly compare him to those first *Greeks*, who travelled chiefly into the east to examine the manners and customs of different nations, and to communicate to their fellow-citizens upon their return the knowledge which they had acquired. *Moneacht-apé* indeed, never executed so noble a plan; but he had however conceived it, and had spared no labour and pains to effectuate it. He was by the *French* called the *Interpreter*, because he understood several of the *North American* languages; but the other name which I have mentioned was given him by his own nation, and signifies *the killer of pain and fatigue.* This name was indeed most justly applicable to him; for; to satisfy his curiosity, he had made light of the most dangerous and painful journies in which he had spent several years of his life. He stayed two or three days with me; and upon my desiring him to give me an account of his travels, he very readily complied with my request, and spoke to the following effect:

"I had lost my wife, and all the children whom I had by her, when I undertook my journey towards the sun-rising, I set out from my village contrary to the inclination of all my relations, and went first to the *Chicasaws*, our friends and neighbours, I continued among them several days to inform myself whether they knew whence we all came, or at least whence they themselves came; they, who were our elders; since from them came the language of the country. As they could not inform me, I proceeded on my journey. I reached the country of the *Chaouanous*, and afterwards went up the *Wabash* or *Ohio*, almost to its source, which is in the country of the *Iroquois* or *Five Nations.* I left them however towards the north; and during the winter, which in that country is very severe and very long, I lived in a village of the *Abenaquis*, where I contracted an acquaintance with a man somewhat older than myself, who promised to conduct

conduct me the following spring to the *Great Water*. Accordingly when the snows were melted, and the weather was settled, we proceeded eastward, and, after several days journey, I at length saw the *Great Water*, which filled me with such joy and admiration that I could not speak. Night drawing on, we took up our lodging on a high bank above the water, which was sorely vexed by the wind, and made so great a noise that I could not sleep. Next day the ebbing and flowing of the water filled me with great apprehension; but my companion quieted my fears, by assuring me that the water observed certain bounds both in advancing and retiring. Having satisfied our curiosity in viewing tho great water, we turned to the village of the *Abenaquis*, where I continued the following winter; and after the snows were melted, my companion and I went and viewed the great fall of the river *St. Lawrence* at *Niagara*, which was distant from the village several days journey. The view of this great fall at first made my hair stand on end, and my heart almost leap out of its place; but afterwards, before I left it, had the courage to walk under it. Next day we took the shortest road to the *Ohio*, and my companion and I cutting down a tree on the banks of the river, we formed it into a pettiaugre, which served to conduct me down the *Ohio* and the *Mississipi*, after which, with much difficulty, I went up our small river; and at length arrived safe among my relations, who were rejoiced to see me in good health."

"This journey, instead of satisfying, only served to excite my curiosity. Our old men, for several years, had told me that the *antient speech* informed them that the *Red Men* of the north came originally much higher and much farther than the source of the river *Missouri*; and as I had longed to see, with my own eyes the land from whence our first fathers came, I took my precautions for my journey westwards. Having provided a small quantity of corn, I proceeded up along the eastern bank of the river *Mississipi*, till

I came to the *Ohio*. I went up along the bank of this last river about the fourth part of a day's journey, that I might be able to cross it without being carried into the *Mississipi*. There I formed a *Cageux* or raft of canes, by the assistance of which I passed over the river; and next day meeting with a herd of buffaloes in the meadows, I killed a fat one, and took from it the fillets, the bunch, and the tongue. Soon after I arrived among the *Tamaroas*, a village of the nation of the *Illinois*, where I rested several days, and then proceeded northwards to the mouth of the *Missouri*, which, after it enters the great river, runs for a considerable time without intermixing its muddy waters with the clear stream of the other. Having crossed the *Mississipi*, I went up the *Missouri* along its northern bank, and after several days journey I arrived at the nation of the *Missouris*, where I staid a long time to learn the language that is spoken beyond them. In going along the *Missouri* I passed through meadows a whole day's journey in length, which were quite covered with buffaloes.

"When the cold was past, and the snows were melted, I continued my journey up along the *Missouri* till I came to the nation of the *West*, or the *Canzas*. Afterwards, in consequense of directions from them, I proceeded in the same course near thirty days, and at length I met with some of the nation of the *Otters*, who were hunting in that neighbourhood, and were surprised to see me alone. I continued with the hunters two or three days, and then accompanied one of them and his wife, who was near her time of lying in, to their village, which lay far off betwixt the north and west. We continued our journey along the *Missouri* for nine days, and then we marched directly northwards for five days, more, of the *Otters*, who received me with as much kindness as if I had been of their own nation. A few days after I joined when we came to the *Fine River*, which runs westwards in a direction contrary to that of the *Missouri*. We proceeded down

down this river a whole day, and then arrived at the village a party of the *Otters*, who were going to carry a calumet of peace to a nation beyond them, and we embarked in a pettiaugre, and went down the river for eighteen days, landing now and then to supply ourselves with provisions. When I arrived at the nation who were at peace with the *Otters*, I staid with them till the cold was past, that I might learn their language, which was common to most of the nations that lived beyond them.

"The cold was hardly gone when I again embarked on the *Fine River*, and in my course I met with several nations, with whom I generally staid but one night, till I arrived at the nation that is but one day's journey from the *Great Water* on the west. This nation live in the woods about the distance of a league from the river, from their apprehention of bearded men, who come upon their coasts in floating villages, and carry off their children to make slaves of them. These men were described to be white, with long black beards that came down to their breasts; they were thick and short, had large heads, which were covered with cloth; they were always dressed, even in the greatest heats; their cloaths fell down to the middle of their legs, which with their feet were covered with red or yellow stuff. Their arms made a great fire and a great noise; and when they saw themselves out-numbered by *Red Men*, they retired on board their large pettiaugre. their number sometimes amounting to thirty, but never more.

Those strangers came from the sun-setting, in search of a yellow stinking wood, which dyes a fine yellow colour; but the people of this nation, that they might not be tempted to visit them, had destroyed all those kinds of trees. Two other nations in their neighbourhood however, having no other wood, could not destroy the trees, and were still visited by the strangers; and being greatly incommoded by them, had invited their allies to assist them in making an attack upon

upon them the next time they should return. The following summer I accordingly joined in this expedition, and after travelling five long days journey, we came to the place where the bearded men usually landed, where we waited seventeen days for their arrival. The *Red Men*, by my advice, placed themselves in ambuscade to surprise the strangers, and accordingly when they landed to cut the wood, we were so successful as to kill eleven of them, the rest immediately escaping on board two large pettiaugres, and flying westward upon the *Great Water*.

" Upon examining those whom we had killed, we found them much smaller than ourselves, and very white; they had a large head, and in the middle of the crown the hair was very long; their head was wrapt in a great many folds of stuff, and their cloaths seemed to be made neither of wool nor silk; they were very soft, and of different colours. Two only of the eleven who were slain had fire-arms with powder and ball. I tried their pieces, and found that they were much heavier than ours, and did not kill at so great a distance.

" After this expedition I thought of nothing but proceeding on my journey, and with that design I let the *Red Men* return home, and joined myself those who inhabited more westward on the coast, with whom I travelled along the shore of the *Great Water*, which bends directly betwixt the north and the sun-setting. When I arrived at the villages of my fellow-travellers, where I found the days very long and the nights very short, I was advised by the old men to give over all thoughts of continuing my journey. They told me that the land extended still a long way in a direction between the north and sun-setting, after which it ran directly west, and at length was cut by the *Great Water* from north to south. One of them added, that when he was young, he knew a very old man who had seen that distant land before it was eat away by the *Great Water*, and that when the

Great

Great Water was low, many rocks still appeared in those parts. Finding it therefore impracticable to proceed much further, on account of the severity of the climate, and the want of game, I returned by the same route by which I had set out; and reducing my whole travels westward to days journeys, I compute that they would have employed me thirty-six moons; but on account of my frequent delays, it was five years before I returned to my relations among the *Yazous*."

"The remarkable difference I observed between the Natches, including in that name the nations whom they treat as brethren, and the other people of Louisiana, made me extremely desirous to know whence both of them might originally come. We had not then that fall information which we have since received from the voyages and discoveries of M: De Lisle in the eastern parts of the Russian empire. I therefore applied myself one day to put the keeper of the temple in good humour, and having succeeded in that without much difficulty, I then told him that from the little resemblance I observed between the Natches and the neighbouring nations, I was inclined to believe that they were not originally from the same country, which they then inhabited; and that if the ancient speech taught him any thing on that subject, he would do me a great pleasure to inform me of it. At these words he leaned his head on his two hands, with which he covered his eyes, and having remained in that posture about a quarter of an hour, as if to recollect himself, he answered to the following effect.

"Before we came into this land we lived yonder under the sun, (pointing with his finger nearly south west, by which I understood he meant Mexico,) we lived in a fine country where the earth is always pleasant; there our suns had their abode, and our nation maintained itself for a long time against the ancients of the country, who conquered some of our villages in the plains, but never could force us from the mountains,

tains. Our nation extended itself along the great water where this large river loses itself, but as our enemies were become very numerous, and very wicked, our Suns sent some of our subjects who lived near this river, to examine whether we could retire into the country through which it flowed.—The country on the east side of the river being found extremely pleasant, the Great Sun, upon the return of those who had examined it ordered all his subjects who lived in the plains, and who still defended themselves against the antients of the country, to remove into this land, here to build a temple, and to preserve the eternal fire.

"A great part of our nation accordingly settled here, where they lived in peace and abundance for several generations; the Great Sun, and those who had remained with him, never thought of joining us, being tempted to continue where they were by the pleasantness of the country, which was very warm, and by the weakness of their enemies who had fallen into civil dissentions in consequence of the ambition of one of their chiefs, who wanted to raise himself from a state of equality with the other chiefs of the villages, and to treat all the people of his nation as slaves. During those discords among our enemies, some of them even entered into an alliance with the Great Sun, who still remained in our old country, that he might conveniently assist other brethren who had settled on the banks of the great water to the east of the large river, and extended themselves so far on the coast, and among the isles, that the Great Sun did not hear of them, sometimes for five or six years together.

"It was not till after many generations that the Great Suns came and joined us in this country, where, from the fine climate and the peace we had enjoyed, we had multiplied like the leaves of the trees. Warriors of fire who made the earth to tremble, had arrived in our old country, and having entered into an alliance with our brethern, conquered our ancient

ancient enemies; but attempting afterwards to make slaves of our sons, they rather than submit to them, left our brethern who refused to follow them, and came hither attended only with their slaves

Upon my asking him who those warriors of fire were, he replied that they were bearded white men, somewhat of a brownish colour, who carried arms that darted out fire with a great noise, and killed at a great distance; that they had likewise heavy arms which killed a great many men at once, and like thunder made the earth tremble; and that they came from the sun rising in floating villages.

The ancients of the country he said were very numerous, and inhabited from the Western Coast of the Great Water to the Northern Countries on this side the sun, and very far upon the same coast beyond the sun. They had a great number of large and small villages, which were all built of stone, and in which there were houses large enough to lodge a whole village. Their temples were built with great labour and art, and they made beautiful works of all kinds of materials.

But ye yourselves, said I, whence are ye come? The ancient speech, he replied, does not say from what land we came; all that we know is, that our fathers, to come hither, followed the sun, and came with him from the place where he rises; that they were a long time on their journey, were all on the point of perishing, and were brought into this country without seeking it.

To this account of the keeper of the temple, which was afterwards confirmed to me by the Great Sun, I shall add the following passage of Diodorus Siculus, which seems to confirm the opinion of those who think the eastern Americans are descended from the Europeans, who may have been driven by the winds upon the coasts of Guiana or Brazil.

To the west of Africa, he says, lies a very large island, distant many days sail from that part of our continent. Its fertile soil is partly plain, and partly mountainous. The plain

country is most sweet and pleasant, being watered every where with rivulets, and navigable rivers; it is beautified with many gardens which are planted with all kinds of trees, and the orchards particularly are watered with pleasant streams. The villages are adorned with houses built in a magnificent taste, having pastures ornamented with arbours covered with flowers. Hither the inhabitants retire during the summer to enjoy the fruits which the country furnishes them with in the greatest abundance. The mountainous part is covered with large woods, and all manner of fruit trees, and in the vallies, which are watered with rivulets, the inhabitants meet with every thing that can render life agreeable. In a word, the whole island, by its fertility and the abundance of its springs, furnishes the inhabitants not only with every thing that may flatter their wishes, but with what may also contribute to their health and strength of body. Hunting furnishes them with such an infinite number of animals, that in their feasts they have nothing to wish for in regard either to plenty or delicacy. Besides, the sea, which surrounds the island, supplies them plentifully with all kinds of fish, and indeed the sea in general is very abundant. The air of this island is so temperate that the trees bear leaves and fruit almost the whole year round. In a word, this island is so delicious, that it seems rather the abode of gods than men.

"Anciently, on account of its remote situation, it was altogether unknown; but afterwards it was discovered by accident. It is well known that from the earliest ages the Phenicians undertook long voyages in order to extend their commerce, and in consequence of those voyages established several colonies in Africa and the western parts of Europe.—Every thing succeeding to their wish, and having become very powerful, they attempted to pass the pillars of Hercules and enter the ocean. They accordingly passed those pillars, and in their neighbourhood built a city upon a peninsula of Spain, which they named Gades. There amongst the other buildings

ings proper for the place, they built a temple to Hercules, to whom they instituted splendid sacrifices after the manner of their country. This temple is in great veneration at this day and several Romans who have rendered themselves illustrious by their exploits, have performed their vows to Hercules for the success of their enterprizes.

"The Phenicians accordingly having passed the straits of Spain, sailed along Africa, when by the violence of the winds they were driven far out at sea, and the storm continuing several days, they were at length thrown upon this island. Being the first who were acquainted with its beauty and fertility, they published them to other nations. The Tuscans, when they were masters at sea, designed to send a colony thither, but the Carthaginians found means to prevent them on the two following accounts; first they were afraid lest their citizens, tempted by the charms of that island, should pass over thither in too great numbers, and desert their own country; next they looked upon it as a secure asylum for themselves, if ever any terrible disaster should befal their republic."

This description of Diodorus is very applicable in many circumstances to America, particularly in the agreeable temperature of the climate to Africans, the prodigious fertility of the earth, the vast forests, the large rivers, and the multitude of rivulets and springs. The Natches may then justly be supposed to be descended from some Phenicians or Carthaginians who had been wrecked on the shores of South America in which case they might well be imagined to have but little acquaintance with the arts, as those who first landed would be obliged to apply all their thoughts to their immediate subsistence, and consequently would soon become rude and barbarous. Their worship of the eternal fire likewise implied their descent from the Phenicians; for every body knows that this superstition, which first took its rise in Egypt, was introduced by the Phenicians into all the countries that

they visited. The figurative stile, and the bold Syriac expressions in the language of the Natches, is likewise another proof of their being descended from the Phenicians.

As to those whom the Natches, long after their first establishment, found inhabiting the western coasts of America, and whom we name Mexicans, the arts which they possessed and cultivated with success, oblige me to give them a different origin. Their temples, their sacrifices, their buildings, their form of government, and their manner of making war, all denote a people who have transmigrated in a body, and brought with them the arts, the sciences, and the customs of their country. Those people had the art of writing and also of painting. Their archives consisted of cloths of cotton, whereon they had painted or drawn all those transactions, which they thought worthy of being transmitted to posterity. It were greatly to be wished that the first conquerors of this new world had preserved to us the figures of those drawings; for by comparing them with the characters used by other nations, we might perhaps have discovered the origin of the inhabitants. The knowledge which we have of the Chinese characters, which are rather irregular drawings than characters, would probably have facilitated such a discovery; and perhaps those of Japan would have been found greatly to have resembled the Mexican; for I am strongly of opinion that the Mexicans are descended from one of those two nations. In fact, where is the impossibility, that some prince in one of those countries, upon failing in an attempt to raise himself to the sovereign power, should leave his native country with all his partizans and look for some new land, where, after he had established himself, he might drop all foreign correspondence? The easy navigation of the South Sea renders the thing probable; and the new map of the Eastern bounds of Asia, and the Western of North America, lately published by M. De-Lisle makes it still more likely. This map makes it plainly appear, that between the island of Japan, or Northern Coasts

of

of China, and those of America, there are other lands which to this day have remained unknown; and who will take upon him to say there is no land, because it has never yet been discovered? I have therefore good grounds to believe, that the Mexicans came originally from China or Japan, especially when I consider their reserved and uncommunicative disposition, which, to this day, prevails among the people of the eastern parts of Asia. The great antiquity of the Chinese nation likewise makes it possible that a colony might have gone from thence to America, early enough to be looked upon as the ancient of the country, by the first of the Phenicians who could be supposed to arrive there. As a further corroboration of my conjectures, I was informed by a man of learning in 1752, that in the King's library there is a Chinese manuscript, which positively affirms that America was peopled by the inhabitants of Corea.

Moncacht-apé after giving me an account of his travels, spent four or five days visiting among the Natches, and then returned to take leave of me, when I made him a present of several wares of no great value, among which was a concave mirror about two inches and a half diameter which had cost me about three half-pence. As this magnified the face to four or five times its natural size, he was wonderfully delighted with it, and would not have exchanged it with the best mirror in France. After expressing his regret at parting with me, he returned highly satisfied to his own nation.

Moncacht-apé's account of the junction of America with the eastern parts of Asia, seems confirmed from the following remarkable fact. "Some years ago the skeletons of two large elephants and two small ones were discovered in a marsh near the river Ohio; and as they were not much consumed, it is supposed that the elephants came from Asia not many years before. If we also consider the form of government, and the manner of living among the northern nations of America, there will appear a great resemblance betwixt them and the Tartars in the north east part of Asia."

The foregoing story has in it many internal marks of truth. Some of the more prominent of them may be here succinctly stated.

Indians who have never seen the ebbing and flowing of the tide are wonderfully struck with this phenomenon. Many of the inhabitants of Quebec must still remember that the great deputation of Indian Chiefs, from the interior and from the Mississippi, which came to Quebec during the administration

tration of Sir George Prevost, and had in their company the sister of Tecumseh, were often to be seen sitting in a row upon a wharf in the Lower Town of Quebec, contemplating in silence, and evidently under the deepest impression of awe, the rising and falling of the waters of the St. Lawrence.

The white men here described correspond in every particular with the Chinese, who, there is reason to believe, held commercial intercourse with the South of Africa long before Vasco de Gama discovered and doubled the Cape of Good Hope. The Chinese are rather smaller than we are and have the palest complexion indigenous to Asia. Their muskets are match-locks and heavier than ours—their powder is inferior in quality.

The stinking wood mentioned by the Indian Chief is probably fustic, yielding a yellow dye which is the prevailing colour of the garments of the superior classes in China.

None of these things could have been known to the Indian Chief, and the general tone and character of Mr. du Pratz's work excludes the idea of his having fabricated the story.

Art. XII.—*Observations on the American Plants described by Charlevoix. By William Sheppard of Woodfield.**

Charlevoix in his "Histoire de la Nouvelle France," describes and figures a certain number of the Plants of North America, being principally such as struck him by their uncommon appearance, or from having the reputation of possessing medicinal or other remarkable properties: of these he always makes due mention; for a knowledge of which his account may be consulted, probably, with some advantage. But his descriptions are, in general, so imperfect and vague, and his figures so little like the plants they are intended to represent, that it is with difficulty they can be identified. These observations may possibly tend to a better acquaintance with the plants he has treated of: little of consequence is added respecting the qualities or application of the

* This Paper was read before the Society for the Encouragement of Arts and Sciences in Canada.

the plants; the intention being more immediately to identify them with the Nomenclature now made use of.* Pursh's Flora, as being the most general book, has been followed, except when differently mentioned.

1. "*Fougere qui porte des bayes.*"

A berry bearing fern to begin with, would strike him as sufficiently marvelous to excite some degree of wonder in his readers. Some perhaps may not have given him full credit for the existence of such an anomalous plant. His description being (with the exception of the berry) quite that of a fern, has been found, after some degree of puzzling, to agree perfectly with Athyrium bulbiferum; *Sprengel*, a fern bearing bulbs on the back of the leaves; a supernumerary means of reproduction possessed by this plant, like some of the lilies, onions, polygonums, &c., and which Charlevoix took to be berries; he is therefore not so much in error as might have been supposed. This plant is found about Quebec.

2. "*Cyprès de la Lousiane.*"

Cupressus disticha. Cypress. A large tree, native of the United States; not found north of 38° 50' according to the younger Michaux.

3. "*Capillaire du Canada.*"

Adiantum pedatum. Maidenhair. A well known Canadian fern, and one of the most beautiful of the family: found on Sillerybank and other parts about Quebec.

4. "*Origan du Canada.*"

Monarda fistulosa. An herbaceous perennial about three feet high, strong scented: a native of Canada but not found near Quebec.

5. 6. "*Myrthe à Chandelle, deux especes.*"

Myrica cerifera and caroliniensis. Candleberry myrtle.—Both these species produce green wax or tallow, by macerating the leaves in warm water: the latter is a small shrub, growing

* Plants, natives of the Southern States of North America, are merely indicated by name, not being so interesting to us as those within our reach.

growing on the shores of the gulf of St. Lawrence: the other is a much larger plant, and grows more to the southward,

7. "*Ipecacuanha de l'Amérique.*"

Podophyllum peltatum. May apple. An herbaceous perennial plant, native of Upper Canada.

8. "*Grande Roquette du Canada.*"

Hesperis pinnatifida? Grows in the western States.

9. "*Tulipier, ou Laurier à fleurs de Tulipe.*"

Liriodendron tulipifera. Called Poplar about New-York. A large tree growing in the middle States, and in Upper Canada.

10. "*Sceau, ou Cachet de Solomon.*"

Convallaria racemosa. Solomon's seal. An herbaceous perennial, with a single stem, somewhat arched, bearing at the summit a raceme of white flowers, followed by red berries; common in the woods in every part of Canada.

11. "*Polygonatum à fleurs jaunes.*"

Uvularia perfoliata. Bellwort. A handsome herbaceous perennial, bearing large yellow pendulous flowers: common in Canada.—Marchmonthill.

12. "*Troisième espèce de Polygonatum.*"

Uvularia sessilifolia? A smaller plant than the foregoing one; flowers straw colour; very common in Ste. Foi wood.

13. "*Le Ginseng.*"

Panax quinquefolia. Ginseng. This plant formerly was an article of export to China: it grows about Montreal.

14. "*Valerienne à feuilles d'orties, et à fleurs violettes.*

15. "*Valerienne à feuilles d'orties, et à fleurs blanches.*"

16. "*Le Sassafras.*"

Laurus sassafras. Sassafras grows throughout the States, and in Upper Canada from Niagara westward.

17. "*Lychnis du Canada.*"

Asarum canadense. Wild Ginger. Grows in moist shady places throughout Canada. Sillery Hill.

18.

18. "*Acacia de l'Amérique.*"

Robinia pseudacacia. Locust. A handsome tree growing to the south of latitude 43°. its wood is very valuable, and generally used in the States for treenails for shipbuilding. This tree probably might bear our climates, as do its congeners R. glutinosa and hispida.

19. "*Grande Pimpernelle du Canada.*"

Sanguisorba canadensis. Burnet. An herbaceous perennial plant growing about Quebec.——Sillery.

20. "*Laurier à fleurs odoriferantes.*"

Magnolia grandiflora? Cucumber tree. His description agrees with this species, except in height, which in favorable soils attains an altitude of 90 feet: probably it may be the glauca, which is a much less tree. These are natives of the States; the acuminata, another species is found on the Niagara frontier.

21. "*Cerfeuil, à larges feuilles du Canada.*"

Chærophyllum canadense. Cerfeuil sauvage. An herbaceous perennial, growing commonly in dry woods, and used by the Canadians as a pot herb.

22. "*Aconit à fleurs de soleil.*"

Rudbeckia laciniata. A showy perennial plant, growing commonly about Quebec. Its quality of being "un vrai poison" does not seem to be known in the present day.

23. "*Thalictrum du Canada.*"

There are several Thalictrums growing about Quebec; the one he describes is supposed to be the pubescens, the tallest of the genus: it grows in moist shady places about Quebec.

24. "*Eupatoire ou Agrimoine à feuilles d'Aunée.*"

Eupatorium purpureum. An herbaceous perennial plant, growing with a single stem to the height of six feet, producing an umbel of purple flowers at the top. Grows in swamps.

Its

Its congener E. perfoliatum is known to be a specific in intermitant fevers: it grows plentifully at the mouth of the river Echemin.

25. "*Alcée de la Floride.*"

Gordonia lasianthus. Loblolly Bay. A large evergreen Tree, bearing a beautiful white flower, the size of a rose. It is a native of the most southern States.

26. "*Belis du Canada.*"

Erigeron heterophyllum? Upper Canada.

27. "*Jasmin de la Floridè,*"

Gelseminum nitidum. Carolina Jasmin. A handsome plant, growing in the southern states.

28. "*Plane d'Occident.*"

Platanus occidentalis. Western Plane tree. Button wood. A large tree, native of the States, growing as far north as Burlington on Lake Champlain. It is a handsome tree, thriving well at Montreal in plantations. Abundant in Upper Canada.

29. "*Angelique a fleurs blanches du Canada.*"

Angelica lucida. An herbaceous plant, native of Canada; growing at Point Levis.

30. "*Angelique à fleurs pourprées.*"

Angelica atropurpurea. This plant resembles the foregoing one, and grows at the same place.

31. "*Laurier rouge.*"

Laurus caroliniensis. Red Bay. A small tree growing in the Southern States.

32. "*Bignonia du Canada.*"

Bignonia radicans. Scarlet trumpet flower. A beautiful perennial climbing plant, growing in Pensylvania and the States south of it.

33. "*Troene aux Bayes violettes.*"

Ligustrum vulgare. Privit. An evergreen shrub said to be a native of Canada, probably of the Upper Province. It is also an European plant.

34. "*Erable à fleurs rouges.*"

Acer rubrum. Red Maple. Called by the Canadians, Plane. A large tree growing commonly about Quebec, and in common with the other maples yields a saccharine sap; but the sugar made from it, is inferior in quality to that obtained from Acer saccharinum and nigrum. It is surprizing that Charlevoix should mention this species only, out of the nine found in America.

35. "*Apios de l'Amérique.*"

Apios tuberosa. Earthnut. A climbing herbaceous plant, producing pea blossoms of a dark brown colour. The tuberous roots are pleasant to eat. It grows in moist shady places and on borders of rivers; Echemin, Island of Orleans, &c.

36. "*Le Sabot de la Vierge.*"

Cyprepedium spectabile. Our Lady's slipper. An orchideous plant. It is one of the most brilliant we have,—rather scarce about Quebec, but is to be found at Marchmont and Ste. Foi meadows. There are four other species of this beautiful genus here; one of them, the C. humile, is very common in Sillery wood.

37. "*Arbre pour le mal de dents.*"

Zanthoxylum fraxineum. Prickly Ash. Frêne piquant. This is a small tree with pinnated leaves, and the branches armed with thorns; its fruit is a small black berry, having a very pungent flavour of lemonpeel. It grows on stony lands about Montreal.

38. "*Cerisier noir de la Floride.*"

Prunus virginiana. Wild Cherry. A tree growing in favorable situations to a large size. The wood in some degree resembles Mahogany, and is much used by Cabinet-makers for making tables and other furniture. Boards and scantling are annually brought to this market from the State of New York, where it grows abundantly, and attains a great size—it is also a native of Canada.

39. "*Serpentaire de l'Amérique.*"

Aristolochia serpentaria. Virginia snake root. An herbaceous perennial plant, native of the Southern States.

40. "*Smilax à feuilles de Laurier,*"

Smilax laurifolia. A southern climbing plant, not Canadian.

41. "*Le Chêne saule.*"

Quercus phellos, *Michaux.* One of his varieties, probably the humilis; Willow oak.—grows in the Southern States.

42. "*Chêne vert à feuilles oblongues.*"

Quercus virens. Live Oak. A native of Virginia to Florida, where the timber is in great request for ship building.

43. "*Chêne à feuilles de Châtaigne.*"

Quercus prinos. *Michaux.* One of his varieties, of which he has several; they are made distinct species by Pursh; mostly natives of the south, although it is probable that some of them may be discovered in Canada. The wood is said to pass as white oak.

44. "*Chêne noir.*"

Quercus ferruginea. *Michaux.* Black jack oak. Grows in New Jersey and southward.

45. "*Chêne blanc aux feuilles armées de pointes.*"

Quercus palustris? Pin Oak. Charlevoix' description is so obscure that it is difficult to identify it with any species; it comes nearest to the palustris. New England, to Pensylvania, in swamps.

46. "*Chêne blanc de Virginie.*"

Quercus alba. White Oak. This Oak is very generally diffused throughout North America, from Canada to Florida, and is of all the species, the most generally useful in the arts. Great quantities of this wood are annually brought to Quebec from Upper Canada and the State of New York, in the log; and made into staves of different sizes for exportation to Europe and the West Indies. It is not found nearer to Quebec, than the Three Rivers.

47. "*Le Chene d'eau.*"

Quercus aquatica. Water Oak. Grows in swamps in Maryland to Florida.

48. "*Le Chêne rouge.*"

Quercus rubra. Red Oak. A large tree, whose wood is of little value, except for dry barrel staves. A very ornamental tree for parks. This is the Oak commonly found about Quebec.

49. "*Peuplier noir de la Caroline.*"

Populus angulata. Mississippi Cotton Tree. A large tree growing in Virginia to Florida; the young branches are angular.

50. "*Liseton pourpre de la Caroline.*"

Convolvulus sagittifolius. A southern climbing herbaceous plant.

51. "*Tupelo.*"

Nyssa tomentosa. Large Tupelo. Wild Olive. A large tree growing in the Carolinas, Georgia and Florida.

52. "*Autre Tupelo.*"

Nyssa biflora. Black Gum. A Southern tree.

53. "*Arbrisseau aromatique.*"

Calycanthus floridus. Carolina alspice. Sweet scented shrub. A native of Carolina.

54. "*Casine ou Apalachine.*"

Ilex vomitaria. A handsome shrub, growing on the sea coast of Carolina to Florida.

55. "*Aconit du Canada.*"

Actæa americana, alba et rubra. Herb Christopher.—White and red Cohosh. An herbaceous perennial plant growing commonly in woods about Quebec; it is said to possess medicinal properties."

56. "*Petit Apocynon du Canada.*"

Apocynum androsæmifolium. Dogbane. An herbacious perennial growing abundantly about Quebec on dry ground: it produces clusters of handsome bell shaped flowers at the

 ends

ends of the branches. It is sometimes called "Herbe à la puce."

57. "*Lierre à trois feuilles du Canada.*"

Rhus toxicodendron. Poison vine. "Herbe à la puce." This is the plant which is supposed to communicate the unpleasant affection of the skin, known by the above canadian name. It grows abundantly on Cape Diamond and on the banks of the St. Lawrence; the climbing variety has not been discovered about Quebec.

58. "*Lierre à cinq feuilles du Canada.*"

Cissus hederacea. Five leaved Ivy. A shrubby climber, growing at Montreal; not found at Quebec except in a cultivated state.

59. "*Trefle du Canada.*"

This appears to be a Psoralea, or Hedysarum.

60. "*Solanum à trois feuilles du Canada.*"

Trillium erectum. Herb true love. An herbaceous perennial producing in May, from the centre of its three leaves, a large brownish purple flower, having a disagreeable scent; plentiful about Quebec.

61. "*Grande consolide du Canada.*"

This is a Solidago, but it is impossible to make out the species by Charlevoix' description; there are a great many in Canada.

62. "*Herbe à Serpens à Sonnettes.*"

Bidens frondosa? An annual plant growing in Pensylvania to Carolina.

63. "*Seneka.*"

Polygala senega. Seneca Snake root. A perennial herbaceous plant, possessing medicinal properties; it has not been found near Quebec.

64. "*Plakminier de la Floride.*"

Diospyrus virginica. Persimon. A tree growing from New York to Florida, bearing a fruit the size of a plum, which is eatable after having been mellow'd by frost.

65.

65. " *La Sarrasine.*"

Sarracenia purpurea. Side saddle flower. An herbaceous perennial growing in sphagnous swamps about Quebec : the leaves are tubular or pitcher shaped and are always filled with water. This very singular plant was named after a Dr. Sarrasin of Quebec.

66. " *Sang Dragon du Canada.*"

Sanguinaria canadensis. Blood root. A perennial herbaceous plant, growing throughout Canada. Its thick fleshy roots are full of a deep red juice, and have cathartic and emetic qualities.

67. " *Matagon du Canada.*"

Cornus canadensis. A low herbaceous plant growing about Quebec on dry ground : it bears a small red fruit four or five together, containing a flat stone ; it is sometimes exposed for sale in market by the name of " Graine de perdrix," but this name I believe, is also given to the fruit of Gautheria procumbens and Mitchella repens.

68. 69. " *La Canneberge, deux especes.*"

Oxycoccus vulgaris and macrocarpus. Two kinds of Cranberry. Atoca. Two slender recumbent shrubby evergreens, growing in swampy and marshy grounds, producing the well known fruit called Cranberry : the former species grows in a sphagnous swamp at Sillery ; the fruit is very delicious : the other grows in abundance in the bays bordering on Lake St. Peter, and bears the fruit usually brought to market.

70. " *Hedisaron à trois feuilles du Canada.*

Hedysarum canescens ? An herbaceous perennial.

71. " *Fumetaire gousseuse et toujours verte du Canada.*"

Corydalis glauca. A beautiful biennial plant, of a light green colour, bearing flowers handsomely marked with yellow red and green : grows in Ste. Foi wood.

72. " *Fumaria tuberosa insipida ; Canadensis.*"

Corydalis cucularia. Breeches flower. A pretty little herbaceous perennial, growing on the Island of Orleans.

73. "*Petite Ancholie du Canada.*"

Aguilegia canadensis. Columbine. A handsome herbaceous perennial, growing on the rocks on the shores of the St. Lawrence, and on Cape Diamond.

74. "*Aster, ou Etoile jaune ailée.*"

Helenium autumnale ? An herbaceous plant having the appearance of a small sunflower; grows on the shores of the St: Lawrence near the Echemin.

75. "*Petite aster d'automne à larges feuilles.*"

Aster macrophyllus. The most common Aster about Quebec; it bears a corymb of pale blue flowers.

76. "*Panacée du Canada.*"

Aralea racemosa. Spikenard. An herbaceous plant growing to the height of four or five feet, generally in shady moist places; its root is aromatic and is said to possess medicinal properties.

77. "*Souchet de l'Amérique.*"

Cyperus odoratus ? A southern grass-like plant growing on banks of rivers.

78. "*Bignonia à feuilles de Rocou.*"

Catalpa syringæfolia. Catalpa. A handsome southern tree; it is much planted about New York for ornament, but too tender to thrive here; a plant at Woodfield annually dies down to the root, making shoots every year about four feet high.

79. "*Petit Laurier de la Caroline.*"

Laurus Benzoin or Dyospyrus; both small shrubs growing in Carolina and southwards.

80. "*Solanun à trois feuilles de la Caroline.*"

Trillium sessile. A southern herbaceous plant, resembles No. 60.

81. "*Le pied de Veau de l'Amérique.*"

Arum sagittifolium. An herbaceous plant growing in the water; Pensylvania to Carolina.

82.

82. "*Racine de la Chine.*"

Smilax tamnoides. An herbaceous climber, native of Virginia to Carolina.

83. "*Chèvrefeuille droite.*"

Azalea periclymenoides. Upright Honey-suckle. An ornamental shrub of several varieties, growing throughout the States : there are many other species, but none are yet found in Lower Canada.

84. "*Elleborine.*

Pogonia ophioglossoides. A beautiful orchideous plant, growing abundantly in a sphagnous swamp at Sillery.

85. "*Arbrisseau aux feuilles d'Aulne.*

Clethra alnifolia. A handsome shrub, native of the United States, New England to Virginia.

86. "*Le Noyer noir.*"

Juglans nigra. Black Walnut. A large tree native of the States and of Upper Canada west of Ontario. Its timber is very dark colour'd, and is much used by Cabinet makers for making tables and other furniture : it is brought to this market in saw'd stuff from the Niagara frontier.

87. "*Faseole à fleurs rouges.*"

Erythrina herbacea. A beautiful perennial of Carolina and Florida.

88. "*Sorbier du Canada.*"

Sorbus americana. Mountain Ash. Masquabina. A small tree producing clusters of red berries, common about Quebec; the whole plant abounds in prussic acid.

89. "*Bruyère qui porte des Bayes.*"

Empetrum nigrum. Crake berry. A low straggling shrub; grows on the islands and shores of the Gulf of St. Lawrence.

90. "*Epinette ou Sapinette du Canada.*"

Pinus nigra v. alba. Black or white Spruce. Two upright pyramidal trees ; from the branches of the former is made the wholesome beverage spruce beer ; and the timber of both, but of the former in preference is manufactured into deals

deals, for exportation to the irish market principally ; they both grow about Quebec, and abundantly throughout Canada.

91. " *Bourdène du Canada.*"

Viburnum nudum ? A small tree growing about Quebec, producing clustres of black fruit.

92. " *Meleze ou Cédre du Canada.*"

Pinus microcarpa. Larch. Epinette rouge. This is a deciduous pine attaining a tolerably large size. The timber is used for spars of hips and the roots for knees. The wood is prefer'd as fuel for steam-boats. Common about Quebec and throughout Canada.

23. " *Bluet du Canada.*"

Vaccinium pensylvanicum. Whurtle berries. Bilberries. A shrub about a foot high, producing the well known fruit of the above names ; it is very common about Quebec.

94. " *Savinier à feuilles de Cyprès du Canada.*"

Juniperus Virginiana. Red cedar. Cédre rouge. A small tree producing the wood with which lead pencils are made. It grows round Lake Ontario, and at the falls of the Ottawa.

95. " *Petit Alisier à feuilles d'Arbousier.*"

Aronia arbutifolia ? *Persoon.* A shrub four or five feet high growing throughout the States.

96. " *Petit Buis du Canada.*"

Vaccinium Vitis Idæa, A recumbent evergreen shrub producing a red whurtle berry ; it is not common, but is to be found on the road side in Sillery wood. It is also an European plant.

97. " *Grande Statice de l'Amérique.*"

98. " *Panacée musquè du Canada.*"

Chærophyllum Claytoni ? An umbelliferous plant, having a pleasant fragrance.

The plants which Charlevoix describes in Nos. 14, 15 & 97, have not been ascertained.

Some observations upon the Myrtus Cerifera or Myrtle-wax Shrub, compiled by W. Green, Esquire.

Among the earliest notices of this tree, or shrub, is that which is found in a letter of a Jesuit Missionary of more than a century back. This letter is to be found in the sixth vol. of the "Lettres Edifiantes" page 127. That part of the letter which relates to this, is as follows; "Le grand luminaire ne contribue pas peu à la decoration de l'Eglise et des Chapelles. Je n'ai pas lieu de menager la cire, car ce pays ci m'en fournit abondamment. Les Isles de la mer sont bordées de lauriers sauvages qui portent en automne des graines à peu-près semblables à celles que portent les génévriers. On en remplit des chaudieres, et on les fait bouillir avec de l'eau; à mesure que l'eau bout, la cire verte surnage et se tient au dessus de l'eau. D'un minot de cette graine, on tire près de quatre livres de cire; elle est tres-pure et tres-belle, mais n'est ni douce ni maniable.— Apres quelques épreuves j'ai trouvé qu'en y mettant autant de suif, ou de bœuf, ou de mouton, ou d'orignal, que de cire, on en fait des cierges beaux, fermes, et d'un très bon usage; avec vingt-quatre livres de cire et autant de suif, on fera deux cens bougies, longues de plus d'un pied de Roi. On trouve une infinité de ces lauriers dans les Isles et sur les bords de la mer: une seule personne cueilleroit aisément quatres minots de graine par jour. Cette graine pend par grappes aux branches de l'arbre. J'en ai envoyé une branche à Québec avec un pain de cire; elle a été trouvé excellente.

The next author in whom I find mention made of this tree, is M. Le Page Du Pratz in his history of Lousiana.

This gentleman had a grant of land there, and informs us that he devoted his attention particularly during the sixteen

years he resided there, to the study of the trees and plants which might be cultivated with advantage, and had made such progress in this study, as to be able to send to the West India Company in France no less than three hundred additional plants found in their Possessions, and worthy the attention of the public. His account of the tree is as follows :

The *Myrtle-Wax tree* is one of the greatest blessings with which nature has enriched *Louisiana*, as in this country the bees lodge their honey in the earth to save it from the ravages of the bears who are very fond of it, and don't value their stings. One would be apt to take it, at first sight, both from its bark and its height, for that kind of laurel used in the kitchens. It rises in several stems from the root ; its leaf is like that of the laurel, but not so thick nor of such a lively green. It bears its fruit in bunches like a nosegay, rising from the same place in various stalks about two inches long : at the end of each of those stalks is a little pea, containing a kernel in a nut, which last is wholly covered with wax. The fruit, which is very plentiful, is easily gathered, as the shrub is very flexible. The tree thrives as well in the shade of other trees as in the open air, in watery places and cold countries, as well as in dry grounds and hot climates ; for I have been told that some of them have been found in *Canada*, a country as cold as *Denmark*.

This tree yields two kinds of wax, one a whitish yellow, and the other green. It was a long time before they learned to separate them, and they prepared the wax at first in the following manner. They threw the grains and the stalks into a large kettle of boiling water, and when the wax was detached from them, they scummed off the grains. When the water cooled, the wax floated in a cake at the top, and being cut small, bleach e in a shorter time than bees wax. They now prepare it in this manner ; they throw boiling water upon the stalks and grains till they are entirely floated, and when they

they have stood thus a few minutes, they pour off the water, which carries the finest wax with it. This wax when cold is of a pale yellow colour, and may be bleached in six or seven days. Having separated the best wax, they pour the water again upon the stalks and grains, and boil all together till they think they have separated all the wax. Both kinds are exported to our sugar islands. where the first is sold for 100 *sols* the pound, and the second for 40.

This wax is so brittle and dry that if it falls it breaks into several pieces; on this account however it lasts longer than that of *France*, and is preferred to it in our sugar islands, where the latter is softened by the great heats, and consumes like tallow. I would advise those who prepare this wax to separate the grain from the short stalk before they boil it, as the stalk is greener than the grain, and seems to part easily with its colour. The water which serves to melt and separate the wax is far from being useless. The fruit communicates to it such an astringent virtue, as to harden the tallow that is melted in it to such a degree, that the candles made of that tallow are as firm as the wax candles of *France*. This astringent quality likewise renders it an admirable specific against a dysentery or looseness. From what I have said of the myrtle wax tree, it may well be believed that the *French* of *Louisiana* cultivate it carefully, and make plantations of it."

Much valuable information respecting this shrub is contained in the work of Duhamel on trees and shrubs cultivated in France, without which this compilation would be incomplete. It is treated of in the second volume of that excellent work (Edit. Paris 1804,) page 189.

The article is as follows.

"MYRICA.

MYRICA. Linn. Classe XXII, *Dioécie*. Order V. Pentandrie.

MYRICA. Juss. Classe XV. *Dicotylédones apétales, unisexuelles.* Ordre IV.

LES AMENTACEES,

GENRE.

Chatons oblongs, composés d'écailles uniflores et peu nombreuses, attachées autour d'un axe commun.

Individu male.

CALICE et COROLLE. Nuls, remplacés par une écaille.

ETAMINES, Ordinairement quatre, quelquefois cinq ou six attachées tout-à-fait à la base de l'écaille, ou plutôt au même point que l'écaille sur l'axe du chaton; antheres a quatre sillons et à deux loges qui s'ouvrent latéralement, et écartées l'une de l'autre par le filet qui les porte.

Individu femelle.

CALICE et COROLLE. Comme dans l'individu mâle.

PISTIL. Ovaire attaché sur l'axe commun au même point que l'écaille qui l'accompagne, et terminé par deux styles déliés a stigmate simple.

PERICARPE. Fruit globuleux, composé d'un noyau rempli par une seule graine, et revêtu d'une membrane un peu charnue, couverte d'une couche de cire grenue. Le fruit du Myrica galé est terminé par trois lobes et n'est pas couvert de cire.

GRAINE. Dépourvue d'albumen.

CARACTERE ESSENTIEL. Chatons dioïques; fleurs mâles, composées de quatre étamines accompagnées d'une écaille; fleurs femelles, formées d'une écaille et d'un ovaire à deux styles, qui devient un fruit à noyau uniloculaire monosperme.

CARACTERES

CARACTERES SECONDAIRES. Arbrisseaux aromatiques, ordinairement toujours verds. Feuilles simples et alternes, parsemées de petits points jaunes résineux. Fleurs placées à l'aisselle des feuilles ou au sommet des rameaux.

ORDRE NATUREL. Ce genre est placé dans la seconde section de la famille des Amentacées de Jussieu, avec les Peupliers et les Saules ; mais il a de plus grands rapports avec le *Comptonia*, rangé dans une section différente, parce qu'il porte des chatons mâles et des chatons femelles sur le même individu, au lieu de les avoir sur des individus différents.

DENOMINATION. ETYMOLOGIE. Le nom de Galé, celui de Myrica, celui de Cirier, sont employés en français pour désigner ce genre. *Galé* fut le nom générique adopté par Tournefort. Celui de *Myrica*, tiré du mot grec *myron*, qui signifie parfum, lui fut ensuite substitué par Linnæus. Celui de Cirier a été donné à ces végétaux à cause de la singulière propriété qu'ils ont de porter de la cire.

OBSERVATIONS. On connoît huit Ciriers ; un d'Europe, deux de l'Amérique septentrionale, un du Japon, un des isles Açores, et trois du Cap de Bonne-Espérance. Celui du Japon, est un arbre de petite taille ; les autres ne sont que des arbrisseaux qui s'élévent depuis quatre jusqu'à huit ou neuf pieds. Tous peuvent être naturalisés en France, et mèritent de l'être à cause de leur joli feuillage, de l'odeur aromatique qu'ils exhalent, et de la propriété qu'ils ont de purifier l'air des lieux marécageux où ils aiment à vivre de préférence. Deux seulement, le Myrica galé et celui de Pensylvanie peuvent supporter les froids rigoureux du nord de la France ; les autres qu'on y cultive, en les abritant l'hiver dans l'orangerie, ne peuvent être plantés en pleine terre que dans les départements maritimes du midi.

ESPECES.

ESPECES.

1. MYRICA cerifera.

M· *foliis lanceolatis acutis superne serratis planis nitidulis*— Lam. Encycl. 2. p. 592.

MYRICA *cerifera* (arborescens) *foliis lanceolatis rariter serratis utrinque angustatis acutissimis, fructibus minoribus.* Mich. Fl. Bor. Amer.

Myrtus Brabanticæ similis Caroliniensis baccata, fructu racemoso sessili monopyreno: Pluk. Alm. 260, t. 48. f. 9. Catesb. Carol. 1. p. 69, t. 69.

Myrica cerifera. Variet. angustifolia. Aït. Kew. Common American Candleberry myrtle *des Anglais.*

Cirier ou arbre de cire de la Louisiane, *vulgairement*, Der Wachsbaum *en Allemand.*

2. MYRICA Pensylvanica. *Tab.* 55.

M *foliis oblongis obtusiusculis, aliis superne serratis aliis integerrimis junioribus marginibus revolutis.* Lam. Encycl. 2. p. 592.

MYRICA *cerifera media.* Mich. Fl. Bor. Amer. 2, p. 228.

Myrica (*Caroliniensis*), *foliis lanceolatis serratis caule suffruticoso.* Mill. Dic. 4. n. 3.

Myrtus Brabanticæ similis Caroliniensis humilior, foliis latioribus et magis serratis. Catesb. Carol. 1. p. 13. t. 13.

Myrica Cerifera. Aït. Kew. Broad leaved American Candleberry myrtle *en anglais.* Variet. latifolia, Cirier nain de Caroline.

Ces deux Ciriers furent regardés par Linnœus comme variétés de même espèce et désignés tous deux par le nom de *Myrica Cerifera.* Ils se confondent en effet dans leurs caractères extérieurs par une quantité de nuances intermédiaires; mais le Cirier de la Louisiane ne resiste point aux hivers dans le nord de la France, tandis que celui de Pensylvanie n'y craint pas les froids rigoureux, et cette considération seule suffit à des cultivateurs pour regarder ces deux arbrisseaux comme espèces distinctes. Ils croissent en abondance l'un et l'autre

l'autre en Amérique, au voisinage de la mer, dans les terrains bas et humides, dans les prairies tourbeuses, dans les marais, etc. Celui de Pensylvanie, introduit en Europe comme celui de la Louisiane depuis une centaine d'années, commence à devenir commun en France, où on le cultive dans les bosquests. Il en existe dans les jardins de Malmaison de superbes individus qui ont huit pieds de haut; élévation presque aussi considérable que celle que l'espece acquiert dans son pays natal.

Le diametre de la tige du Cirier de Pensylvanie est d'environ deux pouces lorsqu'il a acquis toute sa croissance; son écorce est lisse et grisâtre; ses branches étalées et rameuses forment une tête arrondie, dont les feuilles, toujours vertes et très aromatiques, ressemblent assez pour la grandeur et la forme à celles du Laurier commun; elles ont une ou deux dents de chaque côté vers le sommet, et sont parsemées en-dessous de points jaunes résineux très apparents. Les chatons mâles qui se developpent vers le milieu du Printems, sont longs d'un pouce, peu serrés, droits et sessiles à l'aisselle des feuilles. Les chatons femelles, sont très courts, produisent de petits fruits ronds comme des grains de poivre, et couverts d'une couche de substance grenue, qui devient blanchâtre pendant l'hiver et leur donne l'apparence de petites dragées.

Le Cirier de la Louisiane a la forme plus élancée que celui de Pensylvanie, les feuilles plus étroites, plus pointues aux deux bouts, plus dentées, plus minces, plus roides, et parsemées de points dorés sur les deux faces, tandis que celles du Cirier de Pensylvanie n'en ont ordinairement que sur la face inférieure.

Michaux, qui, à l'exemple de Linné, a réuni sous le nom de *Myrica cerifera* le Cirier de la Louisiane et celui de Pensylvanie comme variétés de même espece, a établi sous le nom de *Myrica cerifera pumila* une troisieme variété qu'il a observée

observée dans les lieux secs depuis la Caroline jusqu'à la Floride. Cette variété, qui n'est peut-être due qu'à la nature du terrain, est beaucoup plus petite que les précédentes, et n'a pas les feuilles beaucoup plus grandes que le Myrica galé d'Europe,

Culture. Le Cirier de la Louisiane, qu'on abrite l'hiver en orangerie dans le nord de la France, est cultivé en pot et en terre de bruyere, et multiplié par les graines qu'on seme sous châssis sur une couche de chaleur modérée. Celui de Pensylvanie, qu'on plante en pleine terre, aime de préférence le terreau de bruyere, et réussit aussi très bien dans une bonne terre à blé. Il se multiplie de lui-même par des rejetons que produisent les racines, et vient aussi de graines, qu'on seme en plein air en terre de bruyere. Les jeunes individus de cette espece n'ont pas besoin, comme ceux du Cirier de la Louisiane, d'être abrités pendant les froids sous châssis, il suffit de les couvrir d'un peu de paille.

Usages. Les fruits du Cirier de la Louisiane sont plus petits que ceux du Cirier de Pensylvanie. Ceux-ci ont à peu-près la moitié de la grosseur d'un grain de poivre. Leur surface est couverte d'une couche de substance grenue qui fait à-peu-près le quart de leur épaisseur ; elle se réduit en poudre fine sous les doigts, et laisse dans les mains une odeur aromatique très agréable. Lorsqu'on met les fruits dans l'eau bouillante, cette substance grasse, poudreuse, se fond, surnage, et se fige par le refroidissement en une matiere dure qui tient de la nature de la cire et de celle du suif, et avec laquelle on fait des bougies qui répandent en brûlant une odeur parfumée. Elle se casse facilement au lieu de céder comme la cire ordinaire sous le corps qui la presse ; et lorsqu'on la tient dans la main ou dans la bouche à dessein de la ramollir, sa surface fond graduellement si la chaleur est assez forte, tandis que la partie qui n'est pas fondue conserve toujours sa dureté. La saveur de cette substance n'a rien de

désagréable

désagréable; les Hottentots, selon Thumberg, mangent celle que leur fournissent les Myrica de leur pays. Un Cirier vigoureux produit sept livres de fruits, et quatre livres de fruits donnent une livre de cire. On lit dans Raynal que cette cire végétale tint pendant long-tems lieu de la cire et du suif ordinaires aux premiers Européens qui aborderent en Amérique. Plusieurs autres voyageurs en ont parlé avec éloge ainsi que des avantages qui résulteroient pour le commerce de la naturalisation en Europe d'un arbre aussi précieux que le Cirier. D'une autre part un naturaliste célèbre et sur la véracité duquel on peut compter, a vu, pendant tout le tems qu'il a été consul dans la Caroline, les habitans de cette partie de l'Amérique négliger comme peu lucrative la récolte de fruits des Ciriers, quoique ces végétaux soient très abondants dans leur pays.

Quoiqu'il en soit, le Cirier de Pensylvanie n'en est pas moins une plante précieuse à naturaliser en France. Son odeur aromatique, son joli feuillage toujours verd, sa propriété de résister aux hivers les plus rigoureux, et de vivre dans des terrains marécageux et abandonnés, sont des motifs suffisants pour étendre sa culture; il est en outre regardé comme très propre à purifier l'air des marais: il jouit d'une propriété astringente qui l'a fait employer avec succès par quelques médecins contre la dyssenterie; il peut remplacer la noix de gale dans la composition de l'encre, et l'on estime le savon aromatique qu'on prépare avec la cire des fruits.

This wax is said by Thénard to be *stearine*, or the sebacic principle abounding in and characterizing Suet. It nevertheless possesses a property in which it resembles wax, and differs from suet, for it is volatile at a moderate heat, which suet is not. Suet can only be converted into a state less dense than its fluid form, by a degree of heat sufficient to decompose it; whereas the myrtle wax in a much lower temperature evaporates, and by reducing the temperature is solidified into wax.

At the heat in which it is volatile, it dissolves. Caoutchouc and the compound does not possess the peculiarities of that substance, at the same temperature copal softens in it and becomes opaque and white at the centre. It retains its transparency externally. It dissolves and the compound has none of the characteristics of copal.

The green colouring matter is partly soluble in water, th solution is blackened by sulphate of iron and therefore indicates the presence of Gallic acid.

Catalogue of a few remarkable coincidences, &c. which induce a belief of the Asiatic Origin of the North American Indians, by Major Mercer, R. A.

LEDYARD,	An American intimate with our Indians, on finding himself amongst the Yakuti, Tongusi, &c. of Siberia, felt at once the conviction of their identity.—See Sparke's Life of Ledyard.
FEATHERS,	The Peacock's Feather stuck in the back of the bonnet and hanging down behind is amongst the Mantchoos & Chinese a military distinction ; it is according to some, similar to our Orders of Knighthood, and the dignity is increased by each additional Feather.—The Caufirs of Caubul wear a sort of Turban into which is stuck a long Feather for every Musulman the wearer has killed.—The North American Indian sticks an Eagle's feather in his head-dress for every enemy he has killed. I have seen them

them at Amherstburg wearing these ornaments, and it struck me particularly from their being pendant on the back, or sticking out behind, like those of the Chinese.

FUNEREAL RITES. We find almost every mode in use amongst the Siberians, &c. also amongst one or other of the Indian Tribes, viz. exposing on scaffold; wrapping up in bark; burying in shallow graves covered by a bark roof, over which are suspended flags, pieces of silk, &c.—burning—enclosing in trees; supending from the branches of trees. Also the accompaniments of arms, utensils, food, &c.

BARK UTENSILS & CANOES, &c. La Perouse found baskets of Bark exactly like those of our Indians, on the coast of Tartary.—The Tongusi use the Bark canoe, and La Perouse speaks of the rolls of Bark the inhabitants of Lagalun carry with them, for covering their wigwams.

SNOW SHOES. La Perouse and Lisseps, both found the Snow shoe in Eastern Tartary & Kamtschatka.

MAPS. The Tact displayed by the Indians in delineating the features of a country, is found on the other Continent, and its E. Islands. La Perouse speaks particularly of the Inhabitants of Sagaleen as displaying great intelligence of this sort.

POSITION of MALES for Urinary Evacuations. This Oriental Custom is prevalent among the Indians, I mean that of squatting

	squatting like females.—For its being Asiatic see Burkhardt, I forget what volume, and Forster's overland journey from India vol. 1. p. 245.
REPRESENTATION.	Amongst the Afghauns and American Indians the same mode of Representation prevails. The Council being formed of Representatives from each family, with the Chief or Khan for President.
FEAST of DOGS.	In Kamtschatka and among our Indians the Dog is esteemed a prime delicacy and reserved for gr eat or solemn occasions. In China Puppies are sold in the Markets.
GAMES.	The Indian game at Ball, resembles the Irish Hurling, but still more closely the Basque Game of longue Paume. Also does the enthusiasm and importance attached to it.—The Game of the Bowl is a Tartar Game?
POLYGAMY.	Common to the two people, as also many attendant circumstances.
LOVERS.	The custom of the Lover serving a year in the family of his Future, obtains among some Indian Tribes, as Jacob served Laban.—Ledyard says the Tchouktchis do the same; so do the Tunquinese—vide *Exposé Statistique de Tunquin*.
BARK as FOOD.	Is used by the Kamtschadales and the Indians likewise.
MOCCASSIN.	Ledyard found this among the Kalmouks.

TOBACCO, &c.	The use of Tobacco is said by the Chinese to be of great antiquity amongst them.—The use of the Pipe in ceremonies, &c. is common all over Asia, particularly in the reception and dismissal of Guests &c. this is quite Indian.—The Tongusi always commence by presenting the Pipe.
SCALPING.	Pennat says the Scythians scalped—Polybius has the same of the Carthaginians.
WAMPUM.	Ledyard found it among the Tartars used in ornamenting Dresses, &c.
DEPILATION.	That our Indians pluck out their Beards, &c. is well known—Pallas says the Kalmouks do the same.
SENIORITY.	Those dwelling furthest West are deemed Seniors. See Long's Exped. to St. Peter's River, vol. 1. p. 90.
SACRAMENT.	In the same author vol. 1. p. 92 is described a religious ceremony partaking much of our receiving the Sacrament.
WOMEN.	The Potowatomies and many others conceive Women an inferior order of Beings.
LEGGINS.	Major Long says the Leggin is very similar to a Chinese Garment that supplies the place of Pantaloons.
WHITE.	A sacred colour.—The skin of a white deer for instance being a most acceptable offering ! !—This recals the white heifers of the ancients—

White

	White is the Chinese mourning--*ergo* sacred.
SEPTENNIAL SUPERSTITION.	The Indians say the Deer and Bears, &c. are alternately more numerous every seventh year; they also believe in a Septennial rise of the Waters.—This is found also in some parts of Asia. Morier mentions it in his 2d journey through Persia p. 20.
GUESTS.	In the Entertainment of Guests, the Indians never eat with them, but wait on them.—This is Asiatic. It may have its origin in a superstition entertained by both people, viz. that the least drop of Wine falling on any thing contaminates it.
JOURNEYS, &c.	A great similarity in the mode of travelling is found between Tribes on both continents, such as the use of the Canoe, carrying the bark for their Tents; mode of halting, &c. Portages, &c.
PREPARATION of SKINS,	By the Squaws of the Indians, the Kamtschadales, the Koriacs, &c.
BEDS of TWIGS.	The Indians make extremely comfortable beds of the small Twigs of the Cedar, &c. The Tchoukchis are described as using these beds.
HUNTING.	The mode of driving Deer, Buffaloes, &c. into enclosures as described by Hearne, &c. &c. is precisely like that followed by the Kamtschadales & Koriacs—I think Lessep says so.

SECESSION

SECESSION FROM TRIBES.	We find it no uncommon thing for Parties, to secede from their own Tribe, and obtain adoption in one of another Nation—For an account of a similar practice amongst the Afghauns, see Elphinstone's Caubul, vol. 1. p. 273, 4to.
FRIENDS.	See in the same author vol. 2. pp. 4-5 Ed. 8vo. an account of alliances formed between two young Afghauns mutually to fight for each other, and compare it with the account of similar engagements amongst the Sioux, &c. given by Major Long's Expd. to St. Peter's river, vol. 1. p. p. 233 436.
CHAMPIONS.	Elphinstone vol. 2. p. 29, describes those of the Eusozyes an Afghaun Tribe. Something very similar is found amongst the Tribes W. of the Mississipi.
WAR CHIEFS.	The same Authpr describes a practice of the Afghauns in chosing a Chief, (different from the hereditary Chief) to conduct a War, which is precisely that of the Indian Tribes. See his Caubul 8vo. vol. 2. p. 186.
MAGAZINES.	The earliest European visitors among the Indians describe their mode of storing their corn &c. which is the same as that now practised by the Kamtschadales, Tartars, &c.
LABIALS.	De Guigues, Timskowski &c. &c. observe that the Mantchoux and Chinese are unable to pronounce the letters

	letters B. P. M. F. Father Hennepin says the same of the Iroquois.
TOMAHAWK.	Query. Is this not eminently an Asiatic Weapon ? perhaps not exactly in its present form ; but as a battle axe. Some of the Tartars wear a small axe at the girdle.
WASHING & ANOINTING FEET.	This is repeatedly mentioned by Hennepin and others.
CRUCIFIXION.	Père Hennepin p. 91 asserts that the Iroquois crucify their prisoners, &c.
SPINDLE.	The Squaws used this for making their Thread long before the Europeans visited their country.
CATAMITES.	Boys kept for infamous purposes, are mentioned by several writers on the American Indians, who also describe the Cinœdi, who assume the female garb and employments.--That this abomination exists in China, &c. is pretty fully established, and under aspects very similar.
PSYLLI.	Serpent Charmers are described by P. Hennepin, Carver and others.
POULTRY.	The native country of our domestic hen, is, I believe India. It is a descendant of the Jungle fowl, and I have never heard of its being indigenous in this Continent. Hennepin speaks of domestic fowls amongst Tribes to whom he was the first European Visitor. Query, had they obtained them from the Spaniards ?

If

If not, here is a singular coincidence.

DOGS. The same may be said of the Dog.—Is he indigenous, otherwise it is a singular coincidence that the Indians should have possessed Dogs previous to their being visited by Europeans.

SACRIFICES, And Offerings to the Great Spirit & the Evil one ; a great similarity perhaps identity is found between the modes practised by the Tartars and Indians.

LANGUAGES. Lesseps says that in Kamtschatka alone, in going from one village to another an Interpreter is necessary---This dissimilarity in language eminently prevails amongst the N. A. Indians.

BATHS. The Vapour Bath in Asia and America is the same thing exactly.

DUCK HUNTING. It is remarkable that the same mode of taking wild Fowl by going into the water with a calabash on the head, and seizing them by the legs should be practized in China & about the Isthmus of Darien.

LENDING WIVES. Altho' I have not yet found this Indian Custom, amongst any Siberian Tribe, yet it is said to be practised by the Laplanders.

MATCHE MANITOU, Of the Indians appears to coincide with the Goule or Spirit of the Desert among the Asiatics.

EMBLEMS, Of Tribes—West notices as similar to those of the Tribes of Israel—The Tartars are I believe divided into

 bands

	bands or standards, &c. as that of the Wolf, &c.
JUSTICE.	An offender against any family is punished by that Family, the Chiefs not interfering—the same prevails amongst the Afghauns—see Elphinstone &c.
BRIDGE OF * * *	I forget what the Mahometans call the bridge they must pass to arrive in Paradise—a very similar superstition is prevalent with most of the Indian Tribes.
WIDOWS.	Among the Chippewas and some other tribes a man is bound to marry his brother's widow.
WATER BUDGETS.	The skin budget for water or liquors is found among some tribes on the Mississippi and its tributaries.
FEAST OF LAMPS:	Amongst these also is found a Festival something analogous to the Chinese one in the Margin—at the commencement of Buffalo hunting.—vide Hunter p. 218.
METEMPSYCHOSIS.	Traces of it are found amongst some tribes.
BURNT OFFERINGS,	Are sometimes made—vide Hunter &c.
AMULETS, &c.	Are in constant use amongst the American Indians.
SITTING POSTURE,	The Asiatic mode of sitting cross-legged is common with most tribes. —Is there not also a connection between the Mats placed round the Lodges for this purpose and the nummuds of the Tartars ?

WIGWAMS

WIGWAMS, &c.	Both those of bark and of skin are common and of a common form in Asia and America.
SHIELDS	Of Buffalo used by western tribes—this is truly Asiatic.
NAMES, &c,	The prevalence of Monosyllables in their Names both of persons and things—if we may trust Hunter, are completely Chinese—Thus '*Shu-ja-he-min-keh*'—'*O-kon-now*'—'*Thin-ga-was-sa*'—'*Pa-ton-sech*', &c.
DEATH.	The Indians believe death has been inflicted on the human family in consequence of transgressions against the great Spirit.
COUNTENANCE,	The Mongul countenance is found among some tribes as the Mohawks, &c. The Tartarian features in some tribes are remarkably striking in others they almost if not entirely disappear.
ONCEAN,	Or breech cloth is worn by the Tunkineses, &c.
BAIDAR,	Or skin boat of the Siberians is found here also,
SCALP LOCK & SHAVEN HEADS.	This is well known as Asiatic, at least the second, which may be said to be general throughout Asia—the scalp-lock is peculiar to the Chinese and some Tartar tribes.
DANCES,	The Scalp Dance may be the same as the Pyrrhic Dance, or as the Hungarian War Dance described in Brights' Travels---These Hungarians

 are

are certainly of Tartar origin.---Coxe in his Poland, &c. vol. 1. p. 307, describes a Kalmuck dance which is exactly similar to one I have seen danced by our Indians, but forget whether it is the dog-dance, or what.

PAPPOUS CRADLE--Is the Jætka of the Laplanders, and the treatment of the child &c. exact —The Laplanders, who are they? — vide Accrbi. C. Brooke &c. &c.,

THE BEAR, The Indians have great respect for the Bear, supposing him endowed with superior intellect, that when they attack him, it is customary to address him with reproaches, &c. The same ideas and usages prevail amongst the Laplanders, &c.—vide Lewis & Clark. C. Brooke, &c.

AMADOU. From the most remote period the Nations of Siberia and the American Indians, use the same sort of Tinder for lighting their Pipes, &c.—forget authority for this.

AURORA BOREALIS, In Siberia and in America the tribes think they see the spirits of departed Friends, &c. dancing in the Aurora &c. vid. Hearne—Cap. Brooke, &c.

TATTOOING, Is common on both Continents.

WATER, The Sioux are said to offer water to Strangers, as a symbol of peace, also to those who have offended them as a mark of pardon—The Tartars have a similar usage.

FIRE BRAND. Another usage common to the two people

people is the belief that it is unlucky to cut a stick, &c, which has been partially burnt.

CHILD BIRTH, West says that the Indians esteem a woman impure 40 days after a male and 80 after a female child is born and that similarly to what is enjoined by the Levetical Law, the man must remain separated from her during that period.

MENSTRUATION. In the same manner the women must be put a part during menstruation—I have seen them shut up in lodges surrounded by an enclosure at a distance from the Camp.—The Indians imagine the impurity extends to every thing they have to do with even the Fire, and would on no account go thither for fire.

DELUGE. They all have Traditions of this Catastrophe.

BURNING of WIDOWS. West says is to be found among some Tribes near M'Kenzies River.

STONEING. The same author mentions the practice of stoneing culprits to death among the Micmacs as formerly existing.

PAINTING. The person particularly with Vermillion is found in India, see B. Hebers Journal.—In Kamschatka & Timkowski says the Chinese use it, Vol. 2. p. 90.—Further painting the Face red is common among the Russian *female* Peasants.

TRABUGGAN, Appears to be precisely the Wart of Siberia

	Siberia, vide Bell of Antermony, vol. 1. p. 287.
WAMPUM.	In many parts of Asia, and among some Tartar Tribes it is customary to enregister remarkable events by knotted Cords, or by stringing Beads on Cords—Is not this the Wampum ? ?
HUNTING RULE.	Among the Mongol and Montchoux &c. (I believe) it is a fixed rule that the skin of an animal belongs to the killer.—Somethinganalagous is found among the Indians, who finding a dead beast, are at liberty to take the flesh but must leave the skin. Also a man who discovers the Ravages of the Orignal fixes his mark, and tho' he go in pursuit of something else should another Indian kill his Orignal, the skin belongs to the Discoverer.
NOSE RINGS,	Worn by the Indian and by the Tartar, &c. &c. In China, they are sometimes worn by certain Women who profess chastity.
TORTOISE,	There are various superstitions relative to the Tortoise among the Chinese, Tartars and Indians. The former believe the World rests upon one.—These superstitions require time, means, and great attention, either to ascertain their connection, or the contrary !
IDOLS,	Similar to some found among the Tartars, are known to be venerated by

by the Indians.—A seaman named Brown (probably known to Capt. Bayfield) then employed in the naval establishment at Grand River (1824) told me of one he had seen on Christian Island, Lake Huron.

CANOES, The manner in which the bark Canoe is handled by the Tongusi—their kneeling position whilst rowing, &c. as described by Bell of Antermony is quite Indian.

DREAMS, &c. The Tartars and Siberians dream as well as our Indians, for a remarkable similarity of feeling sentiment, &c. see Mongol Song--Timkowski vol. 1. p. 69 and infra. Is any thing deducible from this; or is it, that the songs of wild people always breathe the same feeling, whether—Celtic, Indian, Mongolian, or Esthonian?

NAMES OF HONOR. We find among the Mongols the same application of brute appellations as among our Indians.--Thus in the former case are the Lion, the strong Elephant, &c. &c.—in the latter, the Wolf, the Tortoise, Blackbird, &c. &c,

DIVINITY, The Omnipresence of the Deity and his other attributes appear to be almost precisely alike among all our Indian Tribes and those of Siberia.—See Timkowski, Ledyard, Hunter, Carver and a multitude of other authors,

EVIL

EVIL SPIRIT,	Is worshipped and prayed to on both Continents for the same purpose, viz. to deprecate his wrath. Here again is a similarity of Forms.
TRADITIONS.	Many Tribes have traditionary history of their having formerly come from the N. West.
TURBAN.	Something resembling this is found in the costume of certain tribes—Pieces of silk, or gaudy handkerchiefs rolled round the head. Is this worth noting ?
CIRCUMCISION.	M'Kenzie says he certainly saw a strong appearance of it (I think) in the Dog-rib Indians.
FIGURATIVE STYLE IN ORATORY.	Gravity and dignity, are all Asiatic.
CONJURORS,	Of the Indians are precisely the Shamans of the Tartars, Siberians and others.

Observations upon Crickets in Canada, by the Hon. J. Hale.

In the month of September, the black Field Crickets are observed to approach the Shores of Rivers and Pools; and as soon as they reach the water, an animated substance issues from their Tails, which resembles an Eel, and which immediately swims away on the surface, by the serpentine motion. Sometimes two of these Eels are produced by one Cricket and they come out together.

The largest Eel that has been noticed is about six inches long, and nearly twice the thickness of a horse hair: they have

have not mouths like eels, but there is at one end, an enlargement of their size, resembling the end of an Elephants Trunk, apparently for the purpose of suction.

The Crickets, after delivery, seem to make some efforts to withdraw from the water; and when there is no surf, they succeed; but they appear exhausted, and many are found dead at the water's edge.

After a short time the Eels collect themselves into small parcels, entwined together, when they resemble unravelled thread, and they sink to the bottom when they soon cease to have motion. The approach of winter has hitherto concealed them from further observation.

Catalogue of Canadian Plants collected in 1827 & presented to the Literary & Historical Society, by the R. H. the Countess of Dalhousie.

MONANDRIA.

DIANDRIA.

Utricularia,
U. . : . . .
Gratiola,
Lindernia dilatata,
Veronica serpyllifolia,
V. . . scutellata,
Lycopus americanus,
Circæa lutiteana,
Anthoxanthum odoratum.

TRIANDRIA.

Iris virginica,
Eriophorum,
Scirpus,
Limnetis,
Panicum capilare,
Digitaria.
Milium,
Aira,
Aira,
Hierochloa,
Poa trivialis,
P. nemoralis,
P.
Bromus,
Avena,

TETRANDRIA.

Houstonia cærulea,

Mitchella repens
Cephalanthus occidentalis,
Linnæa borealis
Galium micranthum,
G. . . bermudianum.
G. . . triflorum,
G. . .
Cornus canadensis,
C . . . .
C . . .
Sanguisorba,
Ilex canadensis,
Sagina apetella,

PENTANDRIA.

Cynoglossum amplexicaule,
Hydrophyllum virginianum,
Lysimachia ciliata,
L. . . . capitata,
L. . . . racemosa,
Menyanthes trifolia,
Convolvulus sepium,
C. . . . stans
Hyocyamus niger,
Solanum nigrum,
Xylosteum solonis,
X. . . . ciliatum,
Lobelia inflata,
L. . . . Kalmii,
L . . cardinalis,
Celastrus scandens,
Vitis cordata,
Ampelopsis hederacea,
Impatiens biflora,
Viola blanda,
V. papillionacea,
V. . . . cucullata,
V. . . . rostrata,
Viola canadensis,
V. . . . pubescens,
Claytonia virginica,
Ribes triflora,
R. nigra,
R. glandulosa,
Apocynum androsæmifolium,
A. . , cannabinum,
Gentiana Saponaria,
G. . . amerelloides,
G . . crinita,
Cuscuta americana,
Panax quinquifolia,
Sanicula marilandica,
Smyrnium,
Asclepias amœna,
A . . . syriaca,
Viburnum oxycoccus,
Viburnum Lentago,
V. . . . lantanoides,
V. . . . prunifolium,
Sambucus pubescens,
S . . . canadensis,
Rhus toxicodendron,
R. . . typhinum,
Hydrocotyte americana,
Aralia racemosa,
A . . nudicaulis,
Diervilla lutea,
Campanula rotundifolia,
C . . . erinoides,

Verbascum

Verbascum thapsus,

HEXANDRIA.

Caulophyllum thalictroides,
Pontederia cordata,
Dracæna borealis,
Erythronium luteum,
Lilium canadense,
Convallaria racemosa,
C. . . stellata,
C. . . pubescens,
C. . . bifolia,
C. . . trifolia,
Uvularia grandiflora,
U. . . sessilifolia,
Streptopus roseus,
Gyromia virginica,
Veratrum viride,
Trillium grandiflorum,
T. . . , cernuum,
Trillium erectum atro-purpureum,
T. . . erectum luteum,
T. . . pictum,
T. . . obtusum,
Alisma plantago,
Rumex acetosella,

HEPTANDRIA.

Trientalis americana,

OCTANDRIA.

Epilobium latifolium,
Epilobium
Œnothera biennis,
Œ. . . pumilla,
Acer dasycarpum,
A. . .
Acer montanum,
A. . . striatum,
Polygonum amphibium vel coccinium.
P. . . . Persicaria,
P. . . .
P. . . .
P. . . .
P. . . sagittatum,
P. . . convolvulus.

ENNEANDRIA.

DECANDRIA.

Cassia marilandica,*
Rhodora canadensis,
Pyrola rotundifolia,
P. . . secunda,
P. . . uniflora,
P. . . minor,
P. . . assarifolia,
P. . . eliptica,
Chimaphyla umbellata,
Kalmia angustifolia,
Andromeda calyculata,
Vaccinium dumosum,
V. . . resinosum.
V. . .
Epigæa repens,
Gaultheria procumbens,

*A Garden specimen, not indigenous, in Lower-Canada.

Gaultheria serpyllifolia,
Ledum palustre,
Monotropa uniflora,
Saxifraga virginiana,
Tiarella cordifolia,
Mitella cordifolia,
M. . · diphylla,
Arenaria lateriflora,
Cucubulus Behen,
Silene,
Penthorum sedoides,
Oxalis stricta,
Agrostemma Githago.
Cerastium vulgare,
C. . . .
Arbutus uva ursi,

DODECANDRIA.

Asarum canadense,
Lythrum verticillatum,
Agrimonia eupatorioides,
Euphorbia corollata,
E. . . . .
E. . . . . depressa,

ICOSANDRIA.

Prunus depressa,
Prunus pennsylvanica,
P. . . serotina,
P. . .
Cratægus punctata,
C. . . . glandulosa,
C. : . .
Aronia arbutifolia,
Aronia botryapium,
A. . . melonacarpa,
Spiræa salicifolia,
S. . . tomentosa,
S. . . opulifolia,
Rosa corymbosa,
R. . lucida,
Rubus odoratus
R. . . villosus,
R. . . trivialis,
R. . . .
R. . . .
Dalibarda repens,
Fragaria virginica,
Potentilla norvegica,
P. . . anserina,
Geum album,
G. . . rivale,
G. . . strictum,

POLYANDRIA.

Actæa alba,
A. . . rubra,
Sarracenia purpurea,
Tilia glabra,
Sanguinaria canadensis,
Nymphæa odorata,
Nuphar advena,
N. . . Kalmiana,
Hypericum prolificum,
H. . . . adpressum,
H. . . . canadense,
H. . . .
H. . . .

Aquilegia

Aquilegia canadensis,
Clematis virginica,
Atragene americana,
Thalictrum purpureum,
T. . . . dioicum,
T. . . . striatum vel rugosum,
Coptis trifolia,
Caltha palustris,
Anemone pennsylvanica vel aconitifolia,
A. . . virginiana,
A. . . nemerosa,
Hepatica triloba,
Ranunculus acris,
R. . . abortivus,
R. . . repens,
R. . . hirsutus,
R. . . cymbalaria,
R. . . filiformis,
R. . . nitidus,
R. . . saneculæformis,

DIDYNAMIA.

Teucrium canadense,
Verbena hastata,
V. . . urticifolia,
Pycnanthemum,
Stachys,
Mentha,
Leonorus cardiaca,
Dracocephalum virginianum,
Scutellaria lateriflora,
S. . galericulata,
Scutellaria parvula,
Prunella pennsylvanica,
Phryma leplostachia,
Melampyrum americanum,
Scrophularia marilandica,
Gerardia purpurea,
Pedicularis canadensis,
Mimulus ringens,
Chelone glabra,

TETRADYNAMIA.

Draba,
Dentaria diphylla,
Cardamine,

MONADELPHIA.

Sisyrinchium anceps,
Geranium carolinianum,

DIADELPHIA.

Corydalis cucullaria,
C. . . . glauca,
C. . . . fungosa,
Lathyrus palustris,
L. . . . venosus,
L. . . . myrtifolius,
Vicia Cracca,
V. . . sattiva,
V. . . pusilla,
Apios tuberosa,
Amphicarpa monoica,
Astragalus canadensis,

Trifolium

Trifolium,
T. . . .
Mililotus,
Hedysarum acuminatum,
H. . . . canadense,

SYNGENESIA.

Prenanthes alba,
P. . . . altissima,
P. . . racemosa,
Hieraceum,
Carduus,
Eupatorium perfoliatum,
E. . purpureum
E. . maculatum,
E. .. ageretoides,
Gnaphalium margaritaceum,
G. . decurrens,
G. . plantagenium,
G. . uliginosum,
Tanacetum vulgare,
Erigeron canadense,
E. . . purpureum,
E. . .
Solidago canadensis,
S. . . latifolia,
S. . . axillaria,
S. . . squamosa,
S. . . lanceolata,
Aster rigidus,
A. . . patens,
A. . . cordatus,
A. . . puniceus,
Aster acuminatus,
Aster recurvatus,
A. . . .
A. . . .
A. . . .
A. . . .
Helenium autumnale,
Anthemis,
Achillæa millefolia,
Rudbeckia laciniata,
Helianthus,
Bidens coreopsis,
B. . . .

GYNANDRIA.

Orchis bifolia,
O ... bracteata,
O ... spectabilis,
O. ... psycodes ?
O. ... fimbriata,
O. . . dilatata,
O . . .
Neottia pubescens,
N. . . . cernua,
N. . . . æstivalis,
Pogonia ophioglossoides,
Cymbidium pulchellum,
Arethusa bulbosa,
Tippularia ophioglossoides,
Cyprepedium spectabile,
Cyprepedium pubescens,
C. . . . parviflorum,
C. . . . humile,
C. . . . arietinum,
Calypso borealis,

MONOECIA.

MONOECIA.

Lemna,
Carex,
C. .
C. .
Urtica gracilis,
U. . . canadensis,
Calla palustris,
Sagittaria sagittifolia,
S. . . .
Arum triphyllum,
Quercus,
Betula,

DIOECIA.

Salix rosmarinifolia,
Salix falcata,
Salix lucida,
S, . . cordata,
S.. . vitellina,
S. . .
S. . .
S. . .
Smilax pedunculosa,
Populus tremuloides,
P. . . grandidentata,
Menispermum,

CRYPTOGAMIA.

Order "FELICES.

Polypodium vulgare,
Polypodium hexagonopterum,
P . . . calcareum,
Onoclea sensibilis,
Struthiopteris nodulosa,
Pteris gracilis,
Asplenium rhizophyllum,
Adiantum pedatum,
Aspedium achrostichoides,
A. . . .
A. . . . aculeatum,
A. . . . marginale,
A. . . . bulbiferum,
A. . . . asplenoides,
A. . . . thelipteris,
A. . . .
Dicksonia pilosiuscola,
Woodsia hyperborea,
Osmunda regalis,
O . . . cinnamomea,
O. . . interrupta,
Botrychium fumaroides,
B. . . .
Lycopodium clavatum,
L. . . . complanatum,
L. . . . dendroidum,
L. . . . annotinum,
L. . . .
Equisetum sylvestre.

ERRATA.

(The Author requests the Reader's attention to this Errata.)

Page 1, for Raministiqui-a, *read* Kaministiqui-a.

Page 7, line 7, for regularly, *read* irregularly.

Page 7, 15th line, for rise, *read* raise, and for upper, *read* opposite.

Page 7, 28th line, for rose, *read* raised.

Page 12, for flinty Greenstone, *read* flinty slate. The comma omitted changes the sense.

Page 20, Note at bottom of page, for is amygdaloid, *read* is in amygdaloid.

Page 21, 15th and 22d lines, for Pic Island, *read* Pie Island.

Page 22, last line for South, *read* North.

Page 38, between the 26th and 27th lines insert, but never on the South Coast. It will then read, but never on the South Coast, or in the old red Sandstone.

Page 41, 5th line, for very numerous, *read*, not very numerous.

At page 80 of the Report the distance between Quebec & Tadoussac is too great—Query, What should it be ? perhaps 45 leagues ?

* Page 145, for Samedi 6th October *read* Mardi 6th December.

Do. for Lundi 8th October *read* Jeudi 8th December.

Do. for 11° audessous *read* 11 audessus, &c.

Page 146, for "plus 7 1-4 of Faht." *read* "plus 56.7 of Faht."

* This extract has been rightly copied from the Original Manuscript which having been written by an old Gentleman contains a few discrepancies originating in the natural failure of his memory, but which deducts nothing from the accuracy of the essential facts.

Catalogue of the MINERALOGICAL COLLECTION *belonging to the Literary and Historical Society of Quebec.**

CLASS I.

ORDER I. GAS.

ORDER II. WATER.

ORDER III. ACID.

GENUS I. CARBONIC-ACID.

GENUS II. MURIATIC-ACID.

GENUS III. SULPHURIC-ACID.

GENUS IV. BORACIC-ACID.

Sp. 1. *Prismatic Boracic-Acid.* Triv. Sassolin. Chem. Boracic-Acid.

1. L. Volcano. Lipari Islands.

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* This collection is arranged agreeably to the system of Prof. Mohs. A description of each of the specimens has not been attempted: occasionally, however, a remark has been added in addition to the locality, for the purpose of calling the attention to some peculiarity connected with the structure, color, or some other character, which, possibly, without it, might have escaped observation.

Abbreviations made use of in the Catalogue.

Ar.	Artificial.
Chem.	Chemical name.
L.	Locality.
Sp.	Species.
Triv.	Trivial name.
Var.	Variety.

GENUS V. ARSENIC-ACID.

Sp. 1. *Octahedral Arsenic-Acid.* Triv. White Oxide of Arsenic. Chem. Arsenious-acid.

2. Ar.

ORDER IV. SALT.

GENUS I. NATRON-SALT.

Sp. 1. *Hemi-Prismatic Natron-Salt.* Triv. Natron. Chem. Carbonate of Soda.

3. L. Africa.

GENUS II. GLAUBER-SALT.

Sp. 1. *Prismatic Glauber-salt.* Triv. Glauber Salt. Chem. Sulphate of Soda.

4. Ar.

GENUS III. NITRE-SALT.

Sp. 1. *Prismatic Nitre-Salt.* Triv. Nitre. Chem. Nitrate of Potash.

5. Ar.

GENUS IV. ROCK-SALT.

Sp. 1. *Hexahedral Rock-Salt.* Triv. Common Salt. Chem. Muriate of Soda.

6. L. Selinas, South America. This specimen was obtained by Capt. Hull. It contains distinct cubical crystals, of a delicate pink color.

7. L. Salt Springs, Syracuse, New-York. Ar. "Hopper shaped crystals," formed at the surface of solutions of this substance.

8. L. Hallein, Lower Austria. Fibrous.

9. L. Hallein, Lower Austria. Lamellar, color sky blue and white.

10. L. Ischel, Upper Austria. Color red.

GENUS V. AMMONIAC-SALT.

Sp. 1. *Octahedral Ammoniac-Salt.* Triv. Sal-ammoniac. Chem. Muriate of Ammonia.

11. L. Vesuvius. With rock salt, upon lava.

GENUS VI. VITRIOL-SALT.

Sp. 1. *Hemi-Prismatic Vitriol Salt.* Triv. Vitriol. Chem. Sulphate of Iron.

12. L. Cumberland, Rhode Island. In the form of a yellowish white incrustation.

Sp. 2. *Tetarto-Prismatic Vitriol-Salt.* Triv. Blue Vitriol. Chem. Sulphate of Copper.

13. L. Parys mine, Anglesea.
14. Ar.

GENUS VII. EPSOM-SALT.

Sp. 1. *Prismatic Epsom-Salt.* Triv. Epsom Salt. Chem. Sulphate of Magnesia.

15. L. Salzburg.
16. L. Near Albany, New-York. Efflorescing from this rock, and may be tasted from this specimen.

GENUS VIII. ALUM-SALT.

Sp. 1. *Octahedral Alum-Salt.* Triv. Alum. Chem. Sulphate of Alumine and Potash.

17. L. Unknown.
18. L. Bohemia. In alum slate.
19. Ar.
20. Ar.

GENUS IX. BORAX-SALT.

Sp. 1. *Prismatic Borax-Salt.* Triv. Borax. Chem. Borate of Soda.

21. L. Peru.
22. Ar.

GENUS X. BRITHYNE-SALT.

Sp. 1. *Prismatic Brithyne-Salt.* Triv. Glauberite.

23. L. Vela Rubia, Spain. Imbedded in rock salt.
24. L. do. do. Loose crystals.

APPENDIX TO CLASS I.

Triv. Red Vitriol. Chem. Sulphate of Cobalt.

25. L. Herrengrund, Hungary.

Triv. Pollyhallite.

26. L. Ischel, Upper Austria.

CLASS II.

ORDER I. HALOIDE.

GENUS I. GYPSUM-HALOIDE.

Sp. 1. *Prismatoidal Gypsum-Haloide.* Triv. Gypsum. Chem. Sulphate of Lime.

27. L. Oxfordshire, England. Chaux sulfatée trapézienne. H.
28. L. do. do. Chaux sulfatée equivalente. H.
29. L. do. do. Chaux sulfatée prominale. H.
30. L. do. do. Chaux sulfatée trapézienne. H. (effloresceing.)
31. L. Ischel, Austria. Prismatic crystals in groups.
32. L. France. Lenticular crystals in groups.
33. L. do. Lenticular crystals collected into a globular mass.
34. L. Niagara, New-York. Crystals imbedded in earthy gypsum.
35. L. England. The arrow-head sulphate of lime.
36. L. England. Lamellar, and transparent.
37. L. Lockport, New-York. Lamellar, embracing crystals of pearl and dog-tooth spar.

38. L. Lockport, New-York.
39. L. Lockport, New-York. This specimen appears to be, in part, a hydro-sulphate of lime,—the loss of a portion of its water causing its efflorescence. It embraces crystals of pearl and dog-tooth spar.
40. L. Nova Scotia. Stellated gypsum.
41. L. Matlock, England. Compactly fibrous.
42. L. Nova Scotia. Coarsely fibrous.
43. L. do. Coarsely granular.
44. L. do. Compact.
45. L. Saxony. Earthy.

Sp. 2. *Prismatic Gypsum-Haloide.* Triv. Anhydrite.

46. L. Ischel, Austria. Crystallised in distinct, right square tables, intersecting each other in such a manner as to form numerous cells: color reddish.
47. L. Montius, Italy. Flesh colored, compact, and laminated.
48. L. Lockport, New-York. Bluish, laminated.
49. L. Vulpino, Italy. Var. Vulpinite.

Genus II. Cryone-Haloide.

Sp. 1. *Prismatic Cryone-Haloide.* Triv. Cryolite.

50. L. Arksut-fiord, West Greenland.

Genus III. Alum-Haloide.

Sp. 1. *Rhombohedral Alum-Haloide.* Triv. Alum-stone.

51. L. Tolfa, near Civita Vecchia.

Genus IV. Fluor-Haloide.

Sp. 1. *Octahedral Fluor-Haloide.* Triv. Fluor. Chem. Fluate of Lime.

52. L. Cornwall, England. In octohedra, of a greyish white color. Chaux fluatée primitive. H.
53. L. Shawneetown, Illinois. An octahedron obtained from cleavage.
54. L. Shawneetown, Illinois. A tetrahedron, obtained from cleavage.

55. L. Shawneetown, Illinois. An acute rhomboid, obtained from cleavage.

56. L. Derbyshire. In purple crystals. Chaux fluateé bordée. H.

57. L. St. Agnes, Cornwall. Purple and white. The two planes which replace each of the edges in 56, are here produced until they extinguish the cubic faces, and result in a figure bounded by twenty-four triangular planes. Chaux fluatée hexatetraedre. H. The two small crystals exhibit this modification best. The specimen contains, also, quartz, topaz, mica, and oxide of tin.

58. L. Cumberland, England. In cubes of a greyish purple color. Chaux fluatée cubique. With small crystals of blende.

59. L. Cumberland, England. In cubes, color purple mixed with white, accompanied by blende and cubo-octohedral crystals of galena.

60. L. Cumberland, England. A large distinct cube, of a pale purple color, with crystals of carbonate of lime in the form of the equilateral rhomboid, and brown crystals of pearl spar.

61. L. Shawneetown, Illinois. In cubes, grouped laterally; color purple.

62. L. Erenfriedersfort. In cubes of a topaz yellow color, coated with minute crystals of quartz and iron pyrites.

63. L. Johann Georgenstadt, Saxony. In greyish yellow cubes, invested by sulphate of barytes, crystals of carbonate of lime, and iron pyrites.

64. L. Saxony. In greenish white cubes, intermingled with crystals of quartz.

65. L. Moldava Bannat. Green; massive fluor, invested by distinct crystals of fluor, of a greyish color.

66. L. Derbyshire, England. White cubic crystals, containing iron pyrites.

67. L. Salzburg, Austria. Massive; dark purple and green; in clay.
68. L. Virginia. Massive; purple and greenish white.
69. L. do. Massive.
70. L. Derbyshire. White, and limpid, (polished.)
71. L. do. Purple and white, do.
72. L. do. Dark purple and whitish, (polished.)
73. L. Hartz. Compact.
74. L. Munroe, Connecticut. (Chlorophane.) Heated in powder, it emits a beautiful emerald-green light. Color pale rose red, which it loses on a short exposure to the light. It contains phosphate of lime in whitish veins and crystals.
75. L. Munroe, Connecticut. Do.

Sp. 2. *Rhombohedral Fluor-Haloide.* Triv. Apatite. Chem. Phosphate of Lime.

76. L. Arendal, Norway. Var. Moroxite. A six sided prism, terminated at one extremity by a six sided pyramid, three of whose planes are unduly extended. The mass of the specimen is coccolite. Upon its under side is violet and green apatite.
77. L. Cornwall. In pale, rose colored, six sided prisms, terminated at each extremity by single planes. The lateral planes situated longitudinally; upon quartz.
78. L. Cornwall. Minute blue crystals in granite with yellow talc. Their form is represented by figures 70 and 71, plate xxx. in the work of the Abbé Hauy.
79. L. Cabo de Gata, Spain. Var. Asparagus stone. Six sided prisms, deeply striated longitudinally, and occasionally terminated with six sided pyramids. Chaux phosphatée didodecaedre. H. With specular iron, imbedded in lava.
80. L. Norway. Massive, intermingled with magnetic iron-ore.
81. L. Germantown, Pennsylvania. Massive and crystallised, in granite.

82. L. Chester, Massachusetts. Massive; of a pale green color; in granite.
83. Williamsburg, Massachusetts. Massive; color yellowish white; in mica slate.
84. L. Bolton, Massachusetts. Massive; color bluish green; with pyroxene and petalite.
85. L. Schlackenwald, Bohemia. Var. Phosphorite.

Genus V. Lime-Haloide.

Sp. 1. *Prismatic Lime-Haloide.* Triv. Arragonite.

86. L. Arragon, Spain. A single crystal, embracing a smaller crystal at right angles to its prismatic axis.
87. L. Arragon, Spain. Several crystals imbedded in gypsum.
88. L. Kosel, Bohemia. Massive, and crystallised.
89. L. Przibram, Bohemia. In six sided prisms, whose lateral planes meet at one extremity in a point.
90. L. Aussig, Bohemia. In white prismatic crystals.
91. L. Retler, Hungary. In acicular crystals, which upon one side of the specimen are collected into globular masses, and tinged with carbonate of copper.
92. L. Bilin, Bohemia. Columnar arragonite; massive.
93. L. Ersenerz, Stiria. Var. Flos-ferri.
94. L. Schemnitz. Do.
95. L. Dufton Lead Mines, England. In fibrous bundles upon quartz.
96. L. Dufton Lead Mines, England. In compact fibres.
97. L. Smithfield, Rhode Island. In minute fibres, mingled with granular limestone.
98. L. France. In acute rhomboids.

Sp. 2. *Rhombohedral Lime-Haloide.* Triv. Limestone. Chem. Carbonate of Lime.

99. L. Bolton, Massachusetts. Chaux carbonatée primitive. H.
100. L. St. Andreasberg, Hartz. Chaux carbonatée basée. H.
101. L. England. Chaux carbonatée prismatique. H.
102. L. Przibram, Bohemia. Chaux carbonatée equiaxe. H. Upon quartz and blende.

103. L. Cumberland, England. Crystallized like 102; the singular arrangement of its crystals gives it the appellation of Nail-head spar.
104. L. England. Crystallized in low six-sided prisms, terminated at each extremity by trihedral summits. Chaux carbonatée dodécaèdre. H.
105. L. England. Do. The sides of the prisms more elongated than 104.
106. L. Hartz. Do. do. crystals more distinct.
107. L. Przibram, Bohemia. The same form with 104, 105, and 106, accompanied by iron pyrites, crystallized in pentagonal dodecahedra.
108. L. Hartz. Chaux carbonatée inverse. H.
109. L. Fontainbleau. Siliceous carbonate of lime, or Fontainbleau limestone.
110. L. Dauphiné. Large, pale rose-colored crystals. Chaux carbonatée bibinaire. H. Penetrated by transparent crystals of quartz.
111. L. Germany. Small white transparent crystals upon fluor. Chaux carbonatée coutume. H.
112. L. Lockport, New York. Chaux carbonatée métastatique. H. with pearl spar.
113. L. do. do.
114. L. England. Chaux carbonatée transposée. H.
115. L. do. do.
116. L. Moldava Bannat. Crystals in yellowish acute pyramids.
117. L. Iceland. Double refracting, or Iceland-spar.
118. L. Vermont. Laminated calcareous-spar.
119. L. do. do.
120. L. Smithfield, Rhode Island. Laminated calcareous-spar.
121. L. Eisenertz, Stiria. Spatheisenstein of Werner. Chaux carbonatée ferrifère. H.
122. L. Chester, Massachusetts. Laminated calcareous-spar, containing crystals of plumbago.
123. L. Middlebury, Vermont. Coarse, granular limestone.
124. L. Munroe, New-York. Red, laminated calcareous-spar.

125. L. Easton, Pennsylvania. Fibrous limestone.
126. L. Southampton, Massachusetts. Var. Argentine or Shiefer-spar.
127. L. Williamsburgh, Massachusetts. do.
128. L. Alston-Moor, England. Var. Satin spar.
129. L. Carrara. Var. Marble.
130. L. Near Philadelphia, Pennsylvania. Var. Marble.
131. L. do. do.
132. L. Middlebury, Vermont. Var. Marble.
133. L. Rhode Island. do.
134. L. Oxford, Vermont. do.
135. L. Italy. do.
136. L. do. do.
137. L. do. do.
138. L. do. do.
139. L. do. do.
140. L. do. do.
141. L. do. do.
142. L. do. do.
143. L. do. do.
144. L. do. do.
145. L. do. do.
146. L. do. do.
147. L. do. do.
148. L. do. do.
149. L. do. do.
150. L. do. do.
151. L. do. do.
152. L. do. do.
153. L. do. do.
154. L. do. do.
155. L. do. do.
156. L. Egypt. do.
157. L. do. do.
158. L. Galway, Ireland. Var. Marble. Bituminous limestone.
159. L. Milford, Connecticut. Var. Verd antique marble
160. L. Egypt. Var. Marble.

161. Hudson, New-York. Containing petrifactions. Var. Shell marble.
162. L. Potomac, Virginia. Var. Breccia-marble.
163. L. West Haven, Connecticut. Var. Verd antique marble.
164. L. Middlebury, Vermont. Var. Rouge antique marble.
165. L. Mount Vesuvius. Var. Volcanic marble.
166. L. Bleyberg, Carinthia. Var. Lumachelli marble.
167. L. New-York. Var. Shell marble.
168. L. do. Compact limestone.
169. L. Lockport, New-York. Fetid limestone.
170. L. Weir's cave, Virginia. Var. Stalactite.
171. L. do. do.
172. L. do. do.
173. L. do. do.
174. L. do. do.
175. L. do. do.
176. L. do. do.
177. L. Sardinia. Var. Tubular stalactite.
178. L. New-York. Var. Stalagmite.
179. L. Gibraltar. do.
180. L. France. do.
181. L. do. do.
182. L. do. do.
183. L. New-York. Var. Calcareous tufa.
184. L. England. do.
185. L. Italy. do.
186. L. Montebaldo, Verona. Var. Oolite.
187. L. Saratoga, New-York. do. black.
188. L. Carlsbad, Bohemia. Var. Pisolite, or Pea-stone.
189. L. England. Var. Chalk.
190. L. Moravia. Var. Marle.
191. L. do. do.
192. L. England. Var. Argillo-ferruginous limestone. Septaria.
193. L. Salzburg. Var. Madreporite. Prismatic Lucullite.
194. L. Munich. Compact argillaceous limestone: Lithographic stone.

195. L. Georgia, five miles south of Augusta. One part of this specimen appears to be the genuine lithographic stone: while the other is a breccia, composed of fragments of quartz, scales of mica, and carbonate of lime.

196. L. Southbury, Connecticut. Fibrous limestone, impregnated with bitumen.

Sp. 3. *Macrotypous Lime-Haloide.* Triv. Dolomite. Bitter-spar. Pearl-spar. Chem. Carbonate of lime and magnesia.

197. L. Smithfield, Rhode Island. Crystallized in the form of the primitive rhomboid.

198. L. Lockport, New-York. Crystallized in the form of the primitive rhomboid, with the edges of the rhomboid curved.

199. L. Lockport, New-York. Crystallized in the form of the primitive rhomboid; the edges slightly bent; pale rose color: upon one side of the specimen are large crystals of dog-tooth spar.

200. L. Zillerthal, Tyrol. In brown minute crystals, associated with equilateral rhomboids of carbonate of lime, upon quartz.

201. L. Berkshire, Massachusetts. In yellowish brown crystals, imbedded in steatite.

202. L. Connecticut. In white crystals, in steatite.

203. L. Cumberland, England. In large crystalline, easily cleavable laminæ. Var. Rhomb-spar, associated with green talc.

204. L. West Springfield, Massachusetts. Massive, of a yellowish white color.

205. Milford, Connecticut. Intermingled with straw colored asbestus, from which it derives its columnar structure. Var. Miascite.

206. L. Milford, Connecticut. do.

207. L. Miemo, Tuscany. Var. Miemite.

208. L. Litchfield, Connecticut. Var. Dolomite; white granular.

209. L. Litchfield, Connecticut. Greyish.
210. L. do. Bluish grey.
211. L. do. Yellowish.
212. L. Smithfield, Rhode Island. Variegated.
213. L. Gurhoff, Lower Austria. Var. Gurhofian.

Sp. 4. *Brachytypous Lime-Haloide.* Chem. Carbonate of magnesia and iron.

214. L. Salzburg, Tyrol. Imbedded in steatite.

ORDER II. BARYTE.

Genus I. Parachrose-Baryte.

Sp. 1. *Brachytypous Parachrose-Baryte.* Triv. Sparry Iron. Chem. Carbonate of Iron.

215. L. Carinthia. In distinct crystals of the primitive form.
216. L. Pyrenees. Crystallized, and massive, with grey copper, in quartz.
217. L. Pyrenees. Crystallized, and massive, with sulphuret of copper.
218. L. Plymouth, Vermont. Massive.
219. L. do. do.
220. L. Unknown. Var. Spherosiderite.

Sp. 2. *Macrotypous Parachrose-Baryte.* Triv. Red Manganese Ore. Chem. Bi-silicate of Manganese.

221. L. Cummington, Massachusetts. Deep rose red color.
222. L. do. do.
223. L. do. do.
224. L. do. Rose red and whitish color.
225. L. do. Rose red and greenish grey color.
226. L. do. do. with a coating of black oxide of manganese.

Genus II. Zinc-Baryte.

Sp. 1. *Prismatic Zinc-Baryte.* Triv. Electric Calamine.

227. L. Freyberg, Brisgau. In botryoidal masses, covered with minute crystals of the same substance.

228. L. Retzbanya, Transylvania. Stalactitical and mammillary.

Sp. 2. *Rhombohedral Zinc-Baryte.* Triv. Calamine. Chem. Carbonate of Zinc.

229. L. England. Zinc oxyde trapezien. H.

230. L. Germany. Compact and mammillated.

231. L. Derbyshire, England. Pseudomorphous calamine.—This form was derived from a large crystal of carbonate of lime.

232. L. Bohemia. Crystallized, and colored by green carbonate of copper.

Genus III. Scheelium-Baryte.

Sp. 1. *Pyramidal Scheelium-Baryte.* Triv. Tungsten. Chem. Tungstate of Lime.

233. L. Bohemia. Crystallized in octohedra, less acute than the primary; upon quartz.

234. L. Scheelgaden, Salzburg. Lamellar, in quartz.

235. L. Huntington, Connecticut. Lamellar.

Genus IV. Hal-Baryte.

Sp. 1. *Peritomous Hal-Baryte.* Triv. Strontianite. Chem. Carbonate of Strontian.

236. L. Strontian, Scotland. In green, fibrous, radiating crystals.

237. L. Strontian, Scotland. In green, fibrous, radiating crystals; in a vein between sulphate of barytes and carbonate of lime.

Sp. 2. *Di-prismatic Hal-Baryte.* Triv. Witherite. Chem. Carbonate of Barytes.

238. Newberg, Stiria.

Sp. 3. *Prismatic Hal-Baryte.* Triv. Heavy Spar. Chem. Sulphate of Barytes.

239. L. England. Baryte sulfatée primitive. H.
240. L. England. Baryte sulfatée dodecaèdre. H.
241. L. Saxony. Baryte sulfatée trapezienne. H.
242. L. Westmoreland. Baryte sulfatée amblytère. H. Crystals transparent.
243. L. Westmoreland. do.
244. L. Mies, Bohemia. In blackish, intersecting, tabular crystals.
245. L. Felsobanya, Transylvania. In tabular crystals, partially invested with yellow orpiment.
246. L. England. In greyish tables, with their edges acuminated, and invested with minute crystals of fluor and iron pyrites. One side of the specimen consists of compact and lamellar reddish heavy spar, intermingled with iron pyrites.
247. L. Matlock, Derbyshire. In globular masses, with galena, crystals of fluor, and carbonate of lead.
248. L. Saxony. In white prismatic crystals.
249. L. Hungary. Fibrous, and lamellar.
250. L. England. Fibrous.
251. L. Schoharie, New-York. Fibrous.
252. L. Monte Paterno, near Bologna. Var. Bolognian stone.
253. L. Saxony. Compact and lamellar; red.
254. L. Southampton, Massachusetts. White; lamellar.
255. L. Stiria. Fine granular; white.
256. L. Saxony. Compact; grey and white, in veins.

Sp. 4. *Prismatoidal Hal-Baryte.* Triv. Celestine. Chem. Sulphate of Strontian.

257. L. Sicily. Strontiane sulfatée émoussée. H. In transparent crystals; with sulphur and gypsum.

258. L. Sicily. Strontiane sulfatée épointée. H. With sulphur upon gypsum.

259. L. Strontian Island, Lake Erie. Tabular crystals, with a bluish tinge, in limestone.

260. L. Lockport, New-York. In coarse fibrous, or columnar masses.

261. L. Devonshire, England. In minute, confusedly aggregated crystals of a reddish color.

262. L. England. With a foliated, or plumose structure; color blue and green.

263. L. France. Compact, and earthy.

Genus V. Lead-Baryte.

Sp. 1. *Di-prismatic Lead-Baryte.* Triv. White Lead Ore. Chem. Carbonate of Lead.

264. L. Southampton, Massachusetts. In white prismatic crystals.

265. L. Cruix, Lorraine. In large, distinct, macled crystals, formed by the intersection of three tabular crystals.

266. L. Lead Hills, Scotland. In imperfect six-sided prisms, some of which are terminated by six-sided pyramids.

267. L. Limbourg. In acicular, confusedly aggregated crystals.

268. L. Lead Hills, Scotland. In reddish, macled crystals, formed by the intersection of two tabular crystals; associated with green phosphate of lead.

269. L. Bleystadt, Bohemia. Black prismatic crystals.

270. L. Hartz. Columnar carbonate of lead.

Sp. 2. *Rhombohedral Lead-Baryte.* Chem. Phosphate of Lead.

271. L. Freyberg, Austria. Crystallized in six-sided prisms, of a grass green color.

272. L. Poullaouen, Lower Brittany. Var. Brown phosphate of lead: in distinct six-sided prisms, of which the sides are slightly convex.

273. L. Huelgoet, Brittany. Arseniated phosphate of lead of Phillips: the crystals are acicular and radiating.

274. L. Lead Hills, Scotland. In low six-sided prisms, with convex faces; color green.

Sp. 3. *Hemi-prismatic Lead-Baryte.* Chem. Chromate of Lead.

275. L. Siberia. Loose crystals.

276. L. do. In rhombic prisms, of 93° 30′, and 86° 30′, intermingled with quartz in a quartzose rock.

Sp. 4. *Pyramidal Lead-Baryte.* Chem. Molybdate of Lead.

277. L. Bleiberg, Carinthia. Crystallized in flat octohedra, (much flatter than the primary,) and in right square prisms, which are very low; color yellow, associated with galena.

278. L. Bleiberg, Carinthia. Crystallized in low right square prisms, or tables.

Sp. 5. *Prismatic Lead-Baryte.* Chem. Sulphate of Lead.

279. L. Anglesea. In transparent crystals, having the following forms: Plomb sulfatée primitive. H.
" " cuneiforme.
" " trihexahêdre.

GENUS VI. ANTIMONY-BARYTE.

Sp. 1. *Prismatic Antimony-Baryte.* Triv. White Antimony. Chem. Oxide of Antimony.

280. L. Przibram, Bohemia. In tabular, and acicular crystals of a white color, upon crystals of galena and blende.

ORDER III. KERATE.

Genus I. Pearl-Kerate.

Sp. 1. *Hexahedral Pearl-Kerate.* Triv. Horn Silver. Chem. Muriate of Silver.

281. L. Saxony. Massive.

ORDER IV. MALACHITE.

Genus I. Staphyline-Malachite.

Sp. 1. *Uncleavable Staphyline-Malachite.* Triv. Malachite.

282. L. Siberia.

283. L. Sommerville, New Jersey. See American Journal, vol. 8, p. 118.

Genus II. Lyrocone-Malachite.

Sp. 1. *Prismatic Lirocone-Malachite.* Triv. Lenticular Copper-Ore. Chem. Arseniate of Copper.

284. L. Cornwall. Crystallized in flat octohedra; color blue; accompanied by minute crystals of the right prismatic arseniate of copper.

Sp. 2. *Hexahedral Lirocone-Malachite.* Triv. Cube-Ore. Chem. Arseniate of Iron.

285. L. Cornwall. In minute cubical crystals; of a green color; upon quartz.

286. L. Cornwall. In minute cubical crystals.

Genus III. Olive-Malachite.

Sp. 1. *Prismatic Olive-Malachite.* Triv. Olivenite. Chem. Arseniate of Copper.

287. L. Tincroft, England. In prismatic, distinct crystals; also in capillary radiating crystals; upon quartz.

288. L. Tincroft, England. In distinct prismatic crystals.

289. L. Tincroft, England. Var. Wood copper. In greenish and yellowish diverging fibres; slightly decomposing.

Sp. 2. *Di-prismatic Olive-Malachite.* Chem. Phosphate of Copper.

290. L. Liebethen, Hungary. In distinct short prismatic, and octohedral crystals; of a green color; upon quartz.

GENUS IV. AZURE-MALACHITE.

Sp. 1. *Prismatic Azure-Malachite.* Triv. Blue Malachite. Chem. Carbonate of Copper.

291. L. France. In distinct, highly modified rhomboidal crystals; of a deep azure blue color, occasionally coated with green malachite.

292. L. Hartz. In highly modified crystals, accompanied by prismatic crystals of sulphate of barytes.

293. L. Moldavia, Bannat. In minute crystals.

294. L. Hungary. Massive, and crystallized.

GENUS V. EMERALD-MALACHITE.

GENUS VI. HABRONEME-MALACHITE.

Sp. 1. * * * *

Sp. 2. *Hemi-prismatic Habroneme-Malachite.* Triv. Green Malachite. Chem. Carbonate of Copper.

295. L. Moldavia, Bannat. In acicular crystals, upon tile-ore, and associated with blue malachite.

296. L. Siberia. Botryoidal, and mammillated.

297. L. do. do. stalactitical, and fibrous.

298. L. do. do.

299. L. do. Fibrous, upon grey copper.

300. L. Hartz, Saxony. Fibrous, with copper pyrites and quartz.

301. L. Siberia. Mammillated and compact; decomposing.

302. L. do. Amorphous, with red oxide of copper.

303. L. Chessy, France. Var. Epigène green copper.

ORDER V. MICA.

Genus I. Euchlore-Mica.

Sp. 1. *Rhombohedral Euchlore-Mica.* Triv. Copper Mica. Chem. Arseniate of Copper.

304. L. Huel Tamar Mine, England. In six-sided tabular crystals.

Sp. 2. * * * * *

Sp. 3. *Pyramidal Euchlore-Mica.* Triv. Uran-Mica. Chem. Phosphate of Uranium.

305. L. Cornwall. In green cubes; also in quadrangular and hexagonal tables.

Genus II. Cobalt-Mica.

Sp. 1. *Prismatic Cobalt-Mica.* Triv. Cobalt Bloom. Chem. Arseniate of Cobalt.

306. L. Joachimstal. In a peach blossom red efflorescence.

Genus III. Iron-Mica.

Sp. 1. *Prismatic Iron-Mica.* Triv. Vivianite. Chem. Phosphate of Iron.

307. L. Bodenmais, Bavaria. In bluish green prismatic crystals, upon an aggregate of iron pyrites and quartz.

308. L. New-Jersey. In radiating crystals.

309. L. Salisbury, Connecticut. Earthy variety; in a blue powder or crust, upon haematite.

Genus IV. Graphite-Mica.

Sp. 1. *Rhombohedral Graphite-Mica.* Triv. Plumbago. Chem. Carburet of Iron.

310. L. New-Jersey. Crystallized in thin tabular crystals, apparently modifications of the six-sided prism; accompanied by serpentine, somewhat crystallized also, in its structure, and carbonate of lime.

311. L. Ticonderoga, New-York. Foliated in its structure, and disseminated through carbonate of lime, which likewise embraces minute crystalline grains of pyroxene.
312. L. Borrowdale, England. Compact.
313. L. do. do. do.

Genus V. Talc-Mica.

Sp. 1. *Prismatic Talc-Mica.* Triv. Talc. Chlorite. Green Earth.

314. L. Hawley, Massachusetts. Crystallized.
315. L. Haddam, Connecticut. In slightly cohering scales, filling up cavities in granite, accompanied by garnet.
316. L. Easton, Pennsylvania. Slaty.
317. L. Hawley, Massachusetts. do.
318. L. Dedham, Massachusetts. Compact, in a vein.
319. L. Vermont. In confusedly aggregated scales.
320. L. England. Earthy.
321. L. Verona. Var. Green earth.
322. L. Piedmont. Green, in six-sided tables, in a cavity lined with crystals of wine colored garnets, and white crystals of pyroxene.
323. L. Cumberland, Rhode Island. Massive; green and white.
324. L. do. do.
325. L. Easton, Pennsylvania. Lamellar.
326. L. Smithfield, Rhode Island. White, and scaly.
327. L. do. White, and compact:—Var. French chalk, associated with granular limestone.
328. L. Pennsylvania. Var. Indurated talc.
329. L. Molk, Lower Austria. do.
330. L. Worcester, Massachusetts. An impure variety of talc, which appears to have an unusual proportion of water; in consequence of which, when heated before the blowpipe, or on a red hot coal, it exfoliates in a very remarkable manner; shooting out into little

masses resembling worms, and hence called vermic ulite. See American Journal, vol. 7, p. 55.

331. L. Windsor, Massachusetts. Talc in singularly waved layers.

Sp. 2. *Rhombohedral Talc-Mica.* Triv. Mica.

332. L. Alps. Mica prismatique. H. Upon crystals of feldspar.
333. L. Vesuvius. do. With garnet.
334. L. Haddam, Connecticut. Exhibiting a section of a large six-sided table in granite.
335. L. Munroe, New-York. Section of a large rhomboidal crystal.
336. L. do. do.
337. L. Goshen, Massachusetts. In rhomboidal crystals, of a rose red color.
338. L. Middletown, Connecticut. In rhomboidal crystals, of a silvery white color; in granite, associated with green and bluish black tourmaline.
339. L. Middletown, Connecticut. Of a yellow color, and containing slender prisms of green tourmaline.
340. L. Paris, Maine. In large foliae, of a yellowish brown color, containing green and blue tourmaline.
341. L. Paris, Maine. In foliae of a yellowish color.
342. L. Mount Grainer, Tyrol. In silvery white scales, with garnets.
343. L. Vermont. In greyish brown foliae.
344. L. Sterling, Massachusetts. In straw colored foliae.
345. L. Connecticut. Var. Plumose mica.
346. L. do. do.
347. L. Brunswick, Maine. Emerald green color, disseminated through quartz, with iron pyrites.
348. L. West Haven, Connecticut. Var. Clay slate; chiefly composed of mica, which possesses indistinct cleavages.
349. L. Paris, Maine. Var. Lepidolite; in lilac colored scales.
350. L. Moravia. do.

351. L. Chesterfield, Massachusetts. Var. Lepidolite; of a grey color.

GENUS VI. PEARL-MICA.

Sp. 1. *Rhombohedral Pearl-Mica.* Triv. Margarite.

352. L. Sterzing, Tyrol. In pearl grey scales.

ORDER VI. SPAR.

GENUS I. SCHILLER-SPAR.

Sp. 1. *Diatomous Schiller-Spar.* Triv. Schiller-Spar.

353. L. Salzburg.

354. L. Blandford, Massachusetts. Intermingled with a light green foliated substance, not hitherto described.

355. L. Baste, Hartz. Polished.

Sp. 2. *Hemi-prismatic Schiller-Spar.* Triv. Bronzite.

356. L. Montebaldo, Veronese Italy.

357. L. England. In rhomboidal laminae.

Sp. 3. *Prismatoidal Schiller-Spar.* Triv. Hypersthene.

358. L. Labrador.

Sp. 4. *Prismatic Schiller-Spar.* Triv. Anthophyllite.

359. L. Haddam, Connecticut. In clove-brown, slender, interlacing prisms, associated with black tourmaline and decomposing iron pyrites.

360. L. Kongsberg, Norway.

GENUS II. DISTHENE-SPAR.

Sp. 1. *Prismatic Disthene-Spar.* Triv. Kyanite.

361. L. St. Gothard. In blue prismatic crystals, in mica slate, with brown prisms of staurotide.

362. L. Chesterfield, Massachusetts. In blue interlacing prisms.

363. L. do. do.

364. L. do. do.

365. L. do. do.

366. L. Litchfield, Connecticut. In blue interlacing prisms.
367. L. Shutesbury, Massachusetts. do.
368. L. Blandford, Massachusetts. In green prisms in quartz.
369. L. Pfitch, Tyrol. Var. Rhaetizite.

GENUS III. TRIPHANE-SPAR.

Sp. 1. *Prismatic Triphane-Spar.* Triv. Spodumene.

370. L. Goshen, Massachusetts. In broad rhombic prisms of a greenish white color, in granite.
371. L. Goshen, Massachusetts. In broad rhombic prisms, intermingled with indicolite.
372. L. Goshen, Massachusetts. In broad rhombic prisms, intermingled with indicolite.
373. L. Sterling, Massachusetts. Half of a large rhombic prism, divided longitudinally, through the shorter axis of the terminal planes; color white.
374. L. Siidermanland, Sweden. In greenish laminae, imbedded in granite.
375. L. Siidermanland, Sweden. In greenish laminae, imbedded in granite.
376. L. Sterzing, Tyrol. In thin foliae, in quartz.
377. L. Goshen, Massachusetts. In prisms slightly decomposing.

Sp. 2. *Axotomous Triphane-Spar.* Triv. Prehnite.

378. L. Farmington, Connecticut. In closely aggregated and highly modified crystals, of a green color.
379. L. Scotland. do.
380. L. Farmington, Connecticut. In globular masses.
381. L. Scotland, near Glasgow. In globular masses, made up of closely aggregated fibres.
382. L. Farmington, Connecticut. In distinct, greenish white crystals.
383. L. Scotland. In fibrous reniform masses.
384. L. do. In long yellow fibres, intermingled with analcime.
385. L. Hartz. Fibrous and globular.

386. L. Tempelstein, Moravia. Compact, and yellowish brown, upon sienite.

GENUS IV. DYSTOME-SPAR.

Sp. 1. *Prismatic Dystome-Spar.* Triv. Datholite. Chem. Borate of Lime.

387. L. Arendal, Norway. Massive; of a greenish white color.

GENUS V. KOUPHONE-SPAR.

Sp. 1. *Trapezoidal Kouphone-Spar.* Triv. Leucite.

388. L. Mount Vesuvius. Crystallized in trapezohedra, contained in lava.

389. L. Near Rome. Massive, red, imbedded in lava.

Sp. 2. * * * * * *

Sp. 3. *Hexahedral Kouphone-Spar.* Triv. Analcime.

390. L. Fassa, Tyrol. Analcime tripointée. H.

391. L. do. Crystallized in the form of a trapezohedron.

392. L. Giants' Causeway. Crystallized in trapezohedra.

393. L. Giants' Causeway. do.

394. L. Scotland. do.

395. L. do. Massive, and red. Var. Sarcolite.

Sp. 4. *Paratomous Kouphone-Spar.* Triv. Harmotome.

396. L. Strontian, Scotland. In white and grey crystals.

Sp. 5. *Rhombohedral Kouphone-Spar.* Triv. Chabasie.

397. L. Chester, Massachusetts. Crystallized in the form of the primitive rhomboid; with fibrous stilbite, upon mica-slate.

398. L. Chester, Massachusetts. do.

Sp. 6. *Diatomous Kouphone-Spar.* Triv. Laumonite.

399. L. Schemnitz, Hungary. In slender, rhombic prisms; efflorescing; color white.

400. L. Phillipstown, New-York. In slender, rhombic prisms, with stilbite; color white.
401. L. Huelgoet, Brittany. The crystals traversing carbonate of lime.

Sp. 7. *Prismatic Kouphone-Spar.* Triv. Mesotype.

402. L. Giants' Causeway. In capillary crystals, upon analcime.
403. L. Tyrol. In closely aggregated fibres.
404. L. Iceland. Fibrous, and radiating; reddish.
405. L. Faroe. In delicate, white, radiating fibres.
406. L. Fassa, Tyrol. Var. Natrolite. In radiating fibres, which terminate at the surface in regular crystals.
407. L. Fassa, Tyrol. Var. Natrolite. Compact, or indistinctly fibrous.

Sp. 8. *Prismatoidal Kouphone-Spar.* Triv. Stilbite.

408. L. Hartz. In white, transparent, tabular crystals.
409. L. do. do.
410. L. New-Jersey. In white crystals.
411. L. Fassa, Tyrol. Fibrous; red; imbedded in green-earth.

Sp. 9. *Hemi-prismatic Kouphone-Spar.* Triv. Heulandite.

412. L. Iceland. In white transparent crystals, having the form of the right-oblique angled prism, with the acute lateral edges and obtuse solid angles replaced by planes: upon bluish calcedony.
413. L. Scotland. In red crystals.
414. L. do. In red laminae.

Sp. 10. *Pyramidal Kouphone-Spar.* Triv. Apophyllite.

415. L. Cziklowa, Bannat. Crystallized in white transparent crystals, having the form of a right square prism, with the terminal solid angles replaced by planes: the planes resting upon the lateral edges.
416. L. Seiser-Alpe, Tyrol. Foliated, and reddish.

Genus VI. Petaline-Spar.

Sp. 1. *Prismatic Petaline-Spar.* Triv. Petalite.

417. L. Bolton, Massachusetts. Bluish white, with a tinge of pink.

418. L. Bolton, Massachusetts. White, and containing green pyroxene, with minute black crystals, not yet ascertained.

419. L. Sweden. White.

Genus VII. Feldspar.

Sp. 1. *Rhombohedral Feldspar.* Triv. Sommite.

420. L. Monte Somme. In small, white, six-sided prisms, upon lava.

Sp. 2. *Prismatic Feldspar.* Triv. Feldspar.

421. L. Salzburg. In white crystals, some of which contain chlorite.

422. L. Mount St. Gothard. In white transparent crystals.

423. L. do. Var. Adularia. Sections of large crystals.

424. L. Mount St. Gothard. do.

425. L. Haddam, Connecticut. Var. Albite, with quartz, mica, and black tourmaline.

426. L. Haddam, Connecticut. Var. Albite; greenish white, and translucent, with pinite, tourmaline, and quartz.

427. L. Oakham, Massachusetts. Var. Adularia; slightly chatoyant.

428. L. Chesterfield, Massachusetts. Var. Cleavelandite; attached to granite, and containing crystals of rubellite.

429. L. Chesterfield, Massachusetts. Var. Cleavelandite; embracing green tourmaline and rubellite.

430. L. Mount Vesuvius. Var. Ice-spar.

431. L. Chester, Pennsylvania. Common feldspar.

432. L. do. do.

433. L. Boxborough, Massachusetts. Common feldspar; laminated, and fine granular; color milk white.

434. L. Thomastown, Maine. Common feldspar; laminated, and black.

435. L. Charlestown, Massachusetts. In flesh colored prisms, whose centres are white.

436. L. Labrador. Var. Labrador feldspar: opalescent.

437. L. West Farms, New-Jersey. Var. Labrador feldspar: opalescent.

438. L. Beverly, Massachusetts. Var. Amazon stone, or green feldspar.

439. L. Baltimore. Var. Necronite, or fetid feldspar.

440. L. Austria. Var. Compact feldspar.

441. L. Sevre, France. Var. Decomposing feldspar.

442. L. do. Porcelain earth, or porcelain clay.

443. L. do. Terre argileuse à porcelaine.

444. L. do. Kaolin cailloteux: Porcelain clay not washed; crude.

445. L. Sevre, France. Ar. Terre cailloetuse à émail.

446. L. do. " Kaolin lavé.

447. L. do. " Terre cailloteuse (à émail) preparée.

448. L. do. " Cement pour la fabrication des étais.

449. L. do. " First stage of the porcelain vessel; mise en oeuvre.

Sp. 3. *Pyramidal Feldspar.* Triv. Scapolite.

450. L. Boxborough, Massachusetts. In distinct white crystals, imbedded in quartz.

451. L. Boxborough, Massachusetts. do.

452. L. do. In radiating white crystals, imbedded in carbonate of lime, with cinnamon stone, and pargasite.

453. L. Boxborough, Massachusetts. In greyish white crystals, with green phosphate of lime, in quartz.

454. L. Elba. In small reddish crystals, in granite.

455. L. Huntington, Connecticut. Massive, and in radiating fibres.

456. L. Bolton, Massachusetts. Purple, massive scapolite.
457. L. do. do.
458. L. Boxborough, Massachusetts. Compact.
459. L. do. In loose crystals.
460. L. Bolton, Massachusetts. Massive, and amber colored, with hornblende.
461. L. Near Arendal, Norway. Var. Wernerite.
462. L. Mount Vesuvius. Var. Meionite. Crystallized in four and eight-sided prisms, terminated by four-sided pyramids.
463. L. Mount Vesuvius. do. accompanied by masses of the meionite, presenting a fused appearance.
464. L. Pyrenees. Var. Dypire. In slender, white, hexahedral prisms, contained in steatite.

GENUS VIII. AUGITE-SPAR.

Sp. 1. *Paratomous Augite-Spar.* Triv. Augite, or Pyroxene.

465. L. Bohemia. A single crystal. Pyroxène triunitaire. H.
466. L. Hungary. Pyroxène hemitrope. H.
467. L. Bohemia. Pyroxène soustractif. H. Imbedded in basalt.
468. L. Mount Vesuvius. In lava.
469. L. Bolton, Massachusetts. Var. Diopside. In large rhombic crystals, and fibrous masses in quartz.
470. L. Bolton, Massachusetts. The crystals distinctly terminated by planes, and imbedded in calcareous spar.
471. L. New-Jersey. Var. Jeffersonite. In black crystals.
472. L. Munroe, New-York. In green glassy crystals.
473. L. Ticonderoga. In eight-sided prisms, with distinct crystals of sphene.
474. L. Kingsbridge, New-York. In large white prisms, imbedded in granular limestone.
475. L. Mount Vesuvius. Massive, and crystallized; green.
476. L. Munroe, New-York. In small green crystals, dissem inated through flesh colored carbonate of lime.

477. L. Munroe, New-York. Var. Sahlite.
478. L. New-Jersey. do.
479. L. Sweden. do. With garnet.
480. L. Forest of Dean, New-York. Var. Sahlite. With sphene and feldspar.
481. L. Munroe, New-York. Var. Sahlite.
482. L. Scotland. Var. Sahlite. White.
483. L. Bolton, Massachusetts. Var. Sahlite. White and green.
484. L. do. " Mussite.
485. L. Phillipstown, New-York. Var. Coccolite. White.
486. L. Ticonderoga. do. Black.
487. L. Munroe, New-York. do. Green.

Sp. 2. *Hemi-prismatic Augite-Spar.* Triv. Hornblende. Tremolite. Actynolite. Asbestus.

488. L. Amity, New-York. Loose crystals of brown hornblende. Amphibole bis-unitaire. H.
489. L. Bohemia. Single crystal. Amphibole dodécaèdre. H.
490. L. Amity, New-York. Like 488. Imbedded in calcareous spar.
491. L. Boxborough, Massachusetts. Brown hornblende, massive, in carbonate of lime, with blue spinelle.
492. L. Mount Vesuvius. Var. Basaltic hornblende. In black crystals, with mica, and massive quartz.
493. L. Arendal, Norway. Massive hornblende; black.
494. L. Franconia, New-Hampshire. In flattened rhombic prisms, traversing a rock composed of quartz and epidote.
495. L. Chester, Massachusetts. do.
496. L. Hawley, Massachusetts. Var. Fasciculite.
497. L. Chester, Massachusetts. Massive, and black: associated with chlorite, zoisite, garnet, and red sphene.
498. L. Carinthia. Var. Carinthin. Associated with garnet and green hornblende.
499. L. Pennsylvania. Var. Carinthin.
500. L. Vermont. Var. Hornblende slate.

501. L. Corsica. Var. Smaragdite. In saussurite.
502. L. Munroe. Var. Actynolite. In regularly terminated crystals.
503. L. England. do. massive.
504. L. Vermont. do. coarse fibrous.
505. L. Cumberland, Rhode Island. Var. Actynolite. In parallel fibres.
506. L. Brattleborough, Vermont. do. In radiating fibres.
507. L. New-Fane, Vermont. do. In acicular crystals, imbedded in steatite; glassy.
508. L. Vermont. do. do.
509. L. do. do. do.
510. L. Windsor, Massachusetts. Var. Asbestiform actynolite.
511. L. Bellows Falls, Vermont. Massive; greenish white.
512. L. Windsor, Massachusetts. do. do.
513. L. Blandford, Massachusetts. do. in schiller spar.
514. L. Bolton, Massachusetts. Var. Pargasite. In carbonate of lime.
515. L. Boxborough. do do. With cinnamon stone.
516. L. Litchfield, Connecticut. Var. Tremolite. In flat rhombic prisms; loose.
517. L. Litchfield, Connecticut. do. In dolomite.
518. L. Bolton, Massachusetts. Massive.
519. L. do. do.
520. L. do. do.
521. L. do. do.
522. L. Litchfield, Connecticut. Var. Tremolite. Fibrous.
523. L. Moravia. do. Reddish.
524. L. Great Barrington, Massachusetts. Var. Asbestiform tremolite.
525. L. do. do.
526. L. Corsica. Var. Amianthus.
527. L. Dauphiné. Var. Amianthus. Greenish.
528. L. St. Gothard. do. White.

529. L. Newburyport, Massachusetts. Var. Amianthus. In serpentine.
530. L. Pelham, Massachusetts. Common asbestus.
531. L. Kelly-vale, Vermont. do.
532. L. Dauphiné. do.
533. L. New Fane, Vermont. Var. Mountain wood.
534. L. Chester, Pennsylvania. do.
535. L. New Fane, Vermont. do.
536. L. Milford, Connecticut. do.
537. L. do. do.
538. L. do. do.
539. L. do. do.
540. L. do. do.
541. L. do. do. With miascite.
542. L. do. do.
543. L. Saxony. Var. Mountain cork. Containing calcareous-spar.
544. L. Saxony. " Mountain leather.
545. L. Franconia, Vermont. Var. Byssolite. In minute fibres implanted upon garnet.

Sp. 3. *Prismatoidal Augite-Spar.* Triv. Epidote.

546. L. Piedmont. In prismatic, closely aggregated crystals.
547. L. do. do. with crystals of quartz.
548. L. Pelham, Massachusetts. do. with hornblende upon granular epidote, or scorza.
549. L. Hawley, Massachusetts. In greyish crystals, some of which are regularly terminated by planes: imbedded in quartz and hornblende.
550. L. Windsor, Massachusetts. Coarse fibrous, or columnar.
551. L. West Farms, New-Jersey. Var. Scorza. With reddish stilbite.
552. L. Dumbarton, Vermont. Var. Zoisite.
553. L. do. do.
554. L. New Fane, Vermont. do.
555. L. Ashfield, Massachusetts. do.

556. L. Plymouth, Vermont. A large greyish crystal, in granite.
557. L. Williamsburgh, Massachusetts. Var. Zoisite. In bluish crystals.

Sp. 4. *Prismatic Augite-Spar.* Triv. Tabular Spar.
558. L. Willsborough, New-York. With colophonite, and green coccolite.
559. L. Easton, Pennsylvania. Color greenish white.
560. L. Oravitza, Bannat. Fibrous, and intermingled with carbonate of lime and purple copper ore.

GENUS IX. AZURE-SPAR.

Sp. 1. *Dodecahedral Azure-Spar.* Triv. Lapis lazuli.
561. L. Siberia. With feldspar and iron pyrites: polished.

Sp. 2. *Prismatic Azure-Spar.* Triv. Lazulite.
562. L. Salzburg. In quartz.

Sp. 3. *Prismatoidal Azure-Spar.* Triv. Blue Feldspar.
563. L. Krieglach, Upper Stiria. In quartz.

ORDER VII. GEM.

GENUS I. ANDALUSITE.

Sp. 1. *Prismatic Andalusite.* Triv. Andalusite.
564. L. Tyrol. In distinct prismatic crystals.
565. L. Carlisle, Massachusetts. Reddish, in quartz, with tremolite.
566. L. France. do.

GENUS II. CORUNDUM.

Sp. 1. *Dodecahedral Corundum.* Triv. Spinelle.
567. L. Ceylon. Var. Spinelle Ruby. Octahedral crystals of different shades of color.
568. L. Ceylon. Spinelle transposée. H.

569. L. Ceylon. In rolled pebbles, and angular fragments.
570. L. do. do. artificially attached to a specimen of white granular limestone.
571. L. Sparta, New-Jersey. In distinct octahedral crystals, of a dull red color, imbedded in white carbonate of lime, with crystals of greyish hornblende, and wax yellow masses of brucite.
572. L. Bolton, Massachusetts. In imperfect crystals of a pale reddish color, with yellowish brucite, and iron pyrites in white carbonate of lime.
573. L. Boxborough, Massachusetts. Var. Pleonaste. In greenish, indistinct crystals, imbedded in carbonate of lime, with brown mica, and hornblende. A portion of the lime has been removed by the aid of acids.
574. L. Boxborough, Massachusetts. Var. Pleonaste.
575. L. Amity, New-York. Var. Pleonaste. In very distinct octahedra; color green; accompanied by brucite, and imbedded in carbonate of lime.
576. L. Orange, New-Jersey. Var. Pleonaste. Black, with serpentine and compact brucite.
577. L. Orange, New-Jersey. Var. Pleonaste. Color black; an octahedral crystal, measuring four inches round the base; in carbonate of lime.
578. L. Haddam, Connecticut. In minute black octahedra; in white feldspar, with pinite.
579. L. Munzoni, Tyrol. In black octahedra in feldspar.

Sp. 2. *Octahedral Corundum.* Triv. Automalite.

580. L. Fahlun, Sweden. In distinct octahedra, in talcose-slate.
581. L. Franklin Iron Works, New-Jersey. Crystallized and fine granular; color green; in carbonate of lime.
582. L. Haddam, Connecticut. Massive; color green; in granite, with manganesian garnet.
583. L. Haddam, Connecticut. do.

Sp. 3. *Rhombohedral Corundum.* Triv. Corundum.

584. L. Carnatic. A distinct six-sided prism, with a very perfect diagonal cleavage.
585. L. Carnatic. Lamellar; color green; in indianite.
586. L. St. Gothard. In red, flat, six-sided prisms, imbedded in dolomite.
587. L. Ceylon. Var. Oriental ruby.
588. L. Naxos. Var. Emery. With rhaetizite.

Sp. 4. *Prismatic Corundum.* Triv. Chrysoberyl.

589. L. Haddam, Connecticut. In green tabular crystals. On one side of the specimen is seen a macle formed by the crossing of three prismatic crystals. The mass also contains yellowish white beryl.
590. L. Haddam, Connecticut. Crystallized, and massive.
591. L. do. do. with garnet.
592. L. do. Massive; color yellowish green, with garnet.
593. L. do. Crystallized in feldspar, with garnet.
594. L. do. Crystallized, with yellow beryl and large crystals of manganesian garnet.
595. L. Saratoga. Fragments of six-sided prisms, some of which, when moistened, are chatoyant.
596. L. Saratoga. Portion of a crystal imbedded in granite.
597. L. Austria. A very minute crystal.

Genus III. Diamond.

Genus IV. Topaz.

Sp. 1. *Prismatic Topaz.* Triv. Topaz.

598. L. Saxony. In distinct crystals, intermingled with quartz crystals; massive also, and mixed with tourmaline, quartz, and lithomarge.
599. L. Brazil. Loose crystal, of a pink color.
600. L. do. do.. yellowish color.

601. L. Munroe, Connecticut. Loose crystal, of a yellowish color.
602. L. do. Containing a crystal of uncommon dimensions, and a small one artificially attached, which is highly perfect, and transparent.
603. L. Munroe, Connecticut. In large crystals.
604. L. Siberia. Var. Pycnite. With quartz and mica.
605. L. Finbo, Sweden. Var. Pyrophysalite. In granite.

Genus V. Emerald.

Sp. 1. * * * * * *

Sp. 2. *Rhombohedral Emerald.* Triv. Beryl.

606. L. Bowdoinham, Maine. Imbedded in quartz.
607. L. do. do.
608. L. Siberia. A loose crystal, deeply striated longitudinally, and nearly cylindrical.
609. L. Siberia. do. transparent.
610. L. Chesterfield, Massachusetts. A loose crystal, imperfectly terminated at one extremity.
611. L. Near Worcester, Massachusetts. Loose crystal, containing mica and feldspar.
612. L. Ackworth, New-Hampshire. Fragment of a large crystal.
613. L. Haddam, Connecticut. Imbedded in granite.
614. L. Norwich, Massachusetts. A large crystal, with a reentering angle in one of its lateral planes.
615. L. Bowdoinham, Maine. Loose crystals.
616. L. do. do.
617. L. do. do.
618. L. Norwich, Massachusetts. Regular six-sided prism, terminated at each extremity by single planes.
619. L. Haddam, Connecticut. Detached crystals; transparent; color yellow.
620. L. Haddam, Connecticut. A single crystal regularly terminated at one extremity.

621. L. Ackworth, New-Hampshire. Portion of a crystal of yellow beryl.

622. L. Haddam, Connecticut. Massive; color yellow; with chrysoberyl and garnets.

623. L. Goshen, Massachusetts. Massive; color greenish white; with cleavelandite and blue tourmalines, in granite.

Genus VI. Quartz.

Sp. 1. *Prismatic Quartz.* Triv. Iolite.

624. L. Bodenmais, Bavaria. Crystallized, and massive. The form of the crystal is a six-sided prism, with the lateral edges slightly replaced; with iron pyrites.

Sp. 2. *Rhombohedral Quartz.* Triv. Quartz.

625. L. Chesterfield, Massachusetts. In dull grey crystals, apparently possessed of the form of the primitive rhomboid, with its lateral solid angles replaced by triangular planes; in granite.

626. L. Craig-Lockart, Scotland. A single crystal in the form of the dodecahedron, with triangular faces.

627. L. Alps. Crystallized in the form of the double six-sided pyramid, having the edge formed by the meeting of the pyramids, slightly replaced. Crystals smoky, and possessed of a high lustre; upon agate, and forming a portion of a large geode.

628. L. Marmarozh, Bannat. In crystals imbedded in clay slate. Similar to No. 627, except, that the replacement of the edge formed at the meeting of the pyramids is greater,—thus giving rise to the six-sided prism terminated by six-sided pyramids, the more common form of quartz.

629. L. Plainfield, New-York. Single crystal, like 628, with the alternate solid angles formed at the meeting of the prism and pyramid, replaced by small rhombic planes; the replacements upon one extremity of the prism corresponding, or being opposite to those upon the other.

630. L. Plainfield, New-York. Form similar to 629, except that the intervening prism is shorter, and that the rhomboidal planes do not occur in any regular order.

631. L. Plainfield, New-York. Three crystals. do.

632. L. do. do. do. the intervening prisms being rather longer.

633. L. Plainfield, New-York. Three crystals.

634. L. do. Single crystal. Regular six-sided prism, terminated by six-sided pyramids.

635. L. Plainfield, New-York. Four crystals, remarkable for the undue extension of some of their faces, in consequence of which others are thrown out of their proper places, or nearly extinguished, and, consequently, the symmetry of the crystal impaired.

636. L. Easton, Pennsylvania. Var. Irisated quartz. Form like 634. Interior filled with fissures, in consequence of which it exhibits the prismatic colors in a very striking manner.

637. L. Compostella, Spain. Var. Compostella hyacinth. Detached crystals of the form of 634; colored red by iron.

638. L. Compostella, Spain. do. Imbedded in gypsum.

639. L. Bohemia. Var. Iron Flint. Form like 634. The crystals confusedly aggregated; color yellow.

640. L. Alps. Var. Amethyst. Form like 634.

641. L. Paris, Maine. Var. Smoky quartz. Form like 634.

642. L. do. do. The crystals attached to a mass of common quartz by their prismatic sides, and to each other, by the apices of their pyramids.

643. L. Siberia. Var. Amethyst. Form like 642; color dark purple.

644. L. Alps. Crystallized in regular six-sided prisms, terminated at one extremity, by six-sided pyramids: two sides of the pyramids extended at the expense of the others, and in one crystal a remarkable enlargement of a single plane is observed. The crystals eminently transparent.

645. L. Dauphiné. Form like 644. A group of large crystals.

646. L. do. do. The crystals more slender, and partially coated by oxide of iron.

647. L. Mount Blanc. Form like 644, excepting the replacement of some of the solid angles formed at the meeting of the prism and pyramid, by triangular planes. The crystals also present a flattened appearance, in consequence of the undue enlargement of two opposite planes of the prism. They contain chlorite, from whence arises their green color.

648. L. Haddam, Connecticut. Large, white, and nearly opaque crystals of quartz: form like 644, excepting in the pyramids, whose planes are equally produced. All the large crystals from this locality resemble each other in a want of transparency, and lustre, and in having their lateral planes made up of numerous smaller crystals.

649. L. Madagascar. A large single crystal; form like 648; transparent, with air bubbles or cavities traversing the interior in a manner so as to form a resemblance to net-work.

650. L. Dauphiné. A large crystal, with several smaller ones attached to it, (and also crystals of carbonate of lime,) whose lateral planes have not an uniform width from one extremity to the other, but are alternately wider at one end, and shorter at the other. One plane of the pyramid is produced to such an extent as very nearly to extinguish the other five, one of which is reduced to a much smaller size than the adjacent rhomboidal truncation. The crystals, like 647, contain chlorite.

651. L. Pomfret, Vermont. A single crystal; with transverse striae upon all its planes, both lateral and terminal.

652. L. Alps. In flattened prisms, arising from the unequal extension of the lateral planes.

653. L. Alps, Savoy. A regular six-sided prism, terminated at one extremity by a regular six-sided pyramid. With

crystals of feldspar attached to it upon one side, and having its pyramidal extremity penetrated by exceedingly delicate fibres of asbestus.

654. L. New-York. Loose tabular crystals.

655. L. Dauphiné. A group of tabular crystals, colored by chlorite.

656. L. Alps. A transparent single crystal, in which three adjacent faces of the pyramid are produced at the expense of the other three, one of which is scarcely visible; and one of the solid angles between the pyramid and prism is replaced by two rhomboidal planes.

657. L. Haddam, Connecticut. In regular six-sided prisms, with six-sided pyramids, one of which has the alternate planes unduly produced.

658. L. Haddam, Connecticut. A regular crystal of the common form, with smaller ones attached to its base.

659. L. Haddam, Connecticut. The prism slightly curved.

660. L. Vermont. A fragment of a large crystal.

661. L. Scotland. A short six-sided prism, with a six-sided pyramid. An unusual appearance is occasioned in the lower part of the prism by fissures.

662. L. Plainfield, New-York. Single crystal, like 634.

663. L. do. do.

664. L. do. do.

665. L. do. do.

666. L. Smithfield, Rhode Island. A regular six-sided prism, imperfectly terminated.

667. L. Paris, Maine. A regular six-sided prism, terminated by a six-sided pyramid. The prismatic faces are destitute of lustre, owing to numerous transverse striae.

668. L. Lake George, Diamond Island. A six-sided prism, terminated at one extremity by a six-sided pyramid, of which one of the faces is produced so as nearly to extinguish the other five. A rhomboidal truncation is also observable upon this crystal.

669. L. Diamond Island. Three prismatic crystals grouped together.

670. L. Haddam, Connecticut. A six-sided prism tending slightly towards acumination, and finally surmounted by the common six-sided pyramid.

671. L. Haddam, Connecticut. The ordinary prism, surmounted by a six-sided pyramid, of which the alternate planes are unduly produced, in such a manner as to give the crystal the appearance of having a trihedral termination.

672. L. Haddam, Connecticut. do.

673. L. do. Form like 670.

674. L. do. Slender prismatic crystals.

675. L. Hungary. Var. Amethyst. In short six-sided prism, terminated by six-sided pyramids.

676. L. Hungary. Prisms more slender than in 675.

677. L. St. Agnes, Cornwall. Var. Amethyst. In bud-shaped crystals; the prisms tending to an accumination.

678. L. Gayer, Saxony. Var. Smoky quartz. Six-sided prism, surmounted by a six-sided pyramid; the edges and angles between the prism and pyramid variously modified. Color black, but translucent when held near the eye.

679. L. Dauphiné. Var. Smoky quartz. A group of prismatic crystals, terminated as usual by pyramids. With crystals of carbonate of lime.

680. L. Hartz. Var. Ferruginous quartz. In short six-sided prisms, with six-sided pyramids. Color red.

681. L. Dauphiné. A large, irregular shaped crystal of quartz, penetrated by chlorite and asbestus. With carbonate of lime.

682. L. Vermont. Portion of a prism of quartz.

683. L. Snowdon, Wales. Var. Milky quartz. A prismatic crystal, with one plane of the terminating pyramid unduly extended.

684. L. Przibram, Bohemia. Var. Milky quartz. This is the white amethyst of the German mineralogists.

685. L. Sandwich Islands. In six-sided pyramids, upon chalcedony.

686. L. Little Compton, Rhode Island. Var. Radiated quartz, or quartz in closely aggregated, columnar, radiating masses, which terminate at the surface in six-sided pyramids.

687. L. New-Fane, Vermont. Var. Milky quartz. In pyramids.

688. L. do. In pyramids, tinged green by oxide of nickel.

689. L. do. do. This and the preceding variety are sometimes called drusy quartz.

690. L. Williamsburgh, Massachusetts. Var. Pseudimorphous quartz. Or quartz deposited around crystals of carbonate of lime, of the form metastatique of Hauy.

691. Deerfield, Massachusetts. Var. Amethyst. Coarse columnar; of a pale color; in agate.

692. L. Belchertown, Massachusetts. do. With banded-quartz.

693. L. New Fane, Vermont. Colored green by oxide of nickel.

694. L. do. do.

695. L. Alps. Var. Smoky quartz.

996. L. Bohemia. Var. Yellow quartz, or Bohemian topaz.

697. L. Vermont. Var. Amethyst.

698. L. Langenlois, Lower Austria. Var. Fibrous quartz.

699. L. Brighton, Massachusetts. Var. Prase. Quartz penetrated by actynolite.

700. L. Cumberland, Rhode Island. do.

701. L. Spain. Var. Avanturine.

702. L. Bohemia. Var. Lamellar quartz.

703. L. Rabenstein, Bavaria. Var. Rose quartz.

704. L. Chesterfield, Massachusetts. do.

705. L. Topsham, Maine. do.

706. L. Southbury, Connecticut. do.

707. L. do. do.

708. L. Connecticut. Common quartz.

709. L. Salzburg. Var. Siderite, or blue quartz.
710. L. Brunswick, Maine. Var. Black quartz.
711. L. Goshen, Massachusetts. Var. Fetid quartz. Containing carbonate of lime.
712. L. Bohemia. Var. Cellular quartz.
713. L. Schemnitz, Hungary. do.
714 L. France. Var. Spongiform quartz.
715. L. Amherst, Massachusetts. Var. Blue quartz.
716. L. Portsmouth, Rhode Island. Quartz rendered fibrous by amianthus.
717. L. Berkshire, Massachusetts. Var. Arenaceous quartz, or sandstone.
718. L. South America. Var. Elastic quartz.
719. L. France, (Sèvre.) Var. Sand.
720. L. Ceylon. Var. Cat's-eye. Polished.
721. L. Transylvania. Var. Chalcedony. In pseudimorphous cubic crystals, of a blue color.
722. L. Cornwall. Var. Chalcedony. In stalactites; also with pyramidal cavities, probably derived from carbonate of lime.
723. L. Faroe. Var. Chalcedony. Botryoidal and mammillary.
724. L. do. do. Upon quartz.
725. L. Sandwich Isles. Var. Chalcedony. In veins, with quartz.
726. L. Lenox, Massachusetts. do. Mammillary and botryoidal, investing jasper agate.
727. L. Ceylon. Var. Sard.
728. L. Mississippi. do.
729. L. Scotland. Var. Cornelian.
730. L. India. do. Blood red.
731. L. Scotland. do. Polished.
732. L. India. do. do.
733. L. Kosemutz, Silesia. Var. Chrysoprase.
734. L. do. do.
735. L. Siberia. Var. Heliotrope.
736. L. Appenine. Var. Plasma.
737. L. Saugus, Massachusetts. Var. Jasper.

738. L. Saugus, Massachusetts. Var. Jasper.
739. L. Saxony. do. Polished.
740. L. do. do. With veins of calcedony.
741. L. Bohemia. do. Green; polished.
742. L. Faroe. Var. Onyx, or striped chalcedony.
743. L. Scotland. do. Polished.
744. L. Dudley, Worcestershire. Var. Porcelain jasper.
745. L. Straits of Suez. Var. Egyptian jasper. Polished.
746. L. Saxony. Var. Ribbon jasper.
747. L. Deerfield, Massachusetts. Var. Ribbon agate.
748. L. Oberstein. do.
749. L. do. do.
750. L. do. do.
751. L. do. do.
752. L. do. Var. Fortification agate.
753. L. Saxony. " Brecciated agate.
754. L. Scotland. " Moss agate.
755. L. Chester, Massachusetts. Var. Jasper agate.
756. L. Oberstein. do.
757. L. do. do.
758. L. England. Var. Flint.
759. L. do. do.
760. L. France. do.
761. L. Near Albany, New-York. Var. Flinty slate.
762. L. do. " Bassanite, or Lydian stone.
763. L. North-Carolina. Var. Whet slate. Dendritic.
764. L. do. do. do.
765. L. Florida, New-York. Var. Hornstone. Black.
766. L. do. do.
767. L. Bavaria. do. White.
768. L. Hinsdale, Massachusetts. do. Red.
769. L. Pelham, Massachusetts. do. Green.
770. L. Amherst, Massachusetts. do. do.
771. L. Pelham, Massachusetts. do. do.
772. L. Antigua. Var. Woodstone.

773. L. Antigua. Var. Woodstone.
774. L. do. do.
775. L. Hungary. do. Polished.
776. L. Antigua. A madrepore replaced by hornstone.

Sp. 3. *Uncleavable Quartz.* Triv. Opal. Hyalite. Menilite.

777. L. Hungary. Var. Precious opal.
778. L. Saxony. " Common opal.
779. L. Hungary. do.
780. L. Dobersberg, Austria. Var. Semi-opal.
781. L. Faroe. do.
782. L. do. Var. Cacholong.
783. L. Hungary. Var. Ferruginous opal.
784. L. do. " Wood opal.
785. L. Menilmontant, France. Var. Menilite.
786. L. Hungary. Var. Hyalite. Upon basalt.
787. L. Georgia. do. In cavities of carious quartz, or buhrstone.
788. L. St. Michaels. Var. Siliceous sinter.
789. L. do. do. With sulphur and fragments of reeds.
790. L. St. Michaels. Var. Pearl sinter, incrusting siliceous sinter.

Sp. 4. *Empyrodox Quartz.* Pearlstone. Pitchstone. Obsidian.

791. L. Cabo de Gata, Spain. Var. Pearlstone. Containing small grains of obsidian.
792. L. Meissen, Saxony. Var. Pitchstone. Yellowish.
793. L. do. do. Green.
794. L. Hungary. do.
795. L. do. do.
796. L. Mexico. do.
797. L. Mediterranean. Var. Pumice.

Genus VII. Axinite.

Sp. 1. *Prismatic Axinite.* Triv. Axinite.

798. L. Dauphiné. Crystallized with feldspar.
799. L. do. Massive.

Genus VIII. Chrysolite.

Sp. 1. *Prismatic Chrysolite.* Triv. Chrysolite. Olivine.

800. L. Bohemia. Var. Chrysolite.
801. L. Mount Vesuvius. Var. Olivine. With brown mica in lava.
802. L. Karfenstein, Stiria. Var. Olivine.
803. L. Bohemia. do. In basalt.

Genus IX. Boracite.

Sp. 1. *Tetrahedral Boracite.* Triv. Boracite.

804. L. Lüneberg, Brunswick. In transparent crystals, imbedded in gypsum.

Genus X. Tourmaline.

Sp. 1. *Rhombohedral Tourmaline.* Triv. Schorl. Tourmaline. Rubelite.

805. L. Munroe, Connecticut. Var. Schorl. Loose crystal. A three-sided prism terminated at each extremity by a three-sided pyramid: the lateral edges replaced by two planes.
806. L. Haddam, Connecticut. Var. Schorl. do.
807. L. Sweden. Var. Schorl. The crystals not terminated by regular faces; imbedded in talcose slate.
808. L. Tyrol. Var. Schorl. The crystals regularly terminated at only one extremity: in chlorite slate.
809. L. Brattleborough, Vermont. Var. Schorl. do. In quartz.
810. L. Haddam, Connecticut. do. The smaller crystals perfect: in albite.

811. L. Haddam, Connecticut. Var. Schorl. In mica slate.

812. L. Brunswick, Maine. Var. Schorl, or black tourmaline. Tourmaline soustractive. H. With one extremity wanting.

813. L. Brunswick, Maine. Var. Schorl, or black tourmaline. An unusually large crystal, the planes of which possess a high degree of perfection.

814. L. Brunswick, Maine. Var. Schorl, or black tourmaline. Imbedded in quartz.

815. L. Tyrol. Var. Schorl, or black tourmaline. In loose slender crystals, which are translucent, and of a brown color.

816. L. Sweden. Var. Schorl, or black tourmaline. In very perfect crystals, imbedded in quartz.

817. L. Haddam, Connecticut. Var. Schorl, or black tourmaline. In brownish black prismatic crystals, with anthophyllite and iron pyrites.

818. L. Goshen, Massachusetts. Var. Indicolite, or blue tourmaline. In quartz, with yellow mica.

819. L. Goshen, Massachusetts. do. In cleavelandite.

820. L. Paris, Maine. do. In fragments, found loose in the soil.

821. L. Middletown, Connecticut. do. With cleavelandite in quartz.

822. L. Middletown, Connecticut. do.

823. L. Goshen, Massachusetts. do. In curved crystals, imbedded in cleavelandite and white mica.

824. L. Goshen, Massachusetts. do. In pale bluish crystals, some of which are partially surrounded with rubellite. In granite.

825. L. Goshen, Massachusetts. do. In radiating crystals.

826. L. do. do. In white mica.

827. L. do. do. In slender prisms collected laterally into veins which intersect the granite, in various directions.

828. L. Goshen, Massachusetts. Var. Indicolite. In pale blue prisms, with rubellite.

829. L. Goshen, Massachusetts. do. do. and surrounded by pale colored rubellite.

830. L. Goshen, Massachusetts. do. In Spodumene.

831. L. Chesterfield, Massachusetts. Var. Green tourmaline. In deeply striated prisms, containing occasionally rubellite in their centres. The prisms, (with the general figure of three sides,) are often much curved.

832. L. do. do. do. With cleavelandite.

833. L. do. do. do.

834. L. do. do. do.

835. L. do. do. do. With cleavelandite.

836. L. Paris, Maine. do. Fragment of a crystal found loose in the soil.

837. L. do. do. do.

838. L. do. do. do.

839. L. do. do. do.

840. L. do. do. do.

841. L. do. do. With rubellite; imbedded in a decomposing granite.

842. L. Moravia. do. In quartz.

843. L. Middletown, Connecticut. Var. Green tourmaline, traversing mica.

844. L. Goshen, Massachusetts. do. Color dark green: in quarts with mica.

845. L. Goshen, Massachusetts. do. In minute green crystals.

846. L. Kingsbridge, New-York. Var. Brown tourmaline. In granular limestone.

847. L. Goshen, Massachusetts. Var. Yellow tourmaline. In granite, with white massive beryl.

848. L. Elba. Var. Yellow tourmaline. Passing into pale rubellite: in granite.

849. L. Moravia. Var. Rubellite. In lepidolite.

850. L. Chesterfield, Massachusetts. Var. Rubellite. In cleavelandite.
851. L. do. do. do.
852. L. do. do. do. With green tourmaline.
853. L. Paris, Maine. do. Massive: found loose in the soil.
854. L. Paris, Maine. do. Portion of a crystal, partially invested by green tourmaline.
855. L. Paris, Maine. do. do.
856. L. do. do. A pale colored crystal.
857. L. do. do. Massive.
858. L. do. do. With green tourmaline, lepidolite, and cleavelandite, upon crystals of quartz.

Genus XI. Garnet.

Sp. 1. *Pyramidal Garnet.* Triv. Idocrase. Egeran.

859. L Piedmont. Crystallized, and massive.
860. L. Fassa, Tyrol. do.
861. L. Bohemia. In distinct prismatic crystals.
862. L. Mount Vesuvius. do. With garnet and mica.
863. L. Eger, Bohemia. Var. Egeran. Massive, and crystallized.
864. L. Worcester, Massachusetts. Var. Egeran. do.

Sp. 2. *Tetrahedral Garnet.* Triv. Helvin.

865. L. Schwarzenberg, Saxony. Crystallized in tetrahedra, with their summits, or solid angles truncated.

Sp. 3. *Dodecahedral Garnet.* Triv. Garnet.

866. L. Hanover, New-Hampshire. Var. Precious garnet. In regular rhombic dodecahedra. In hornblende slate.
867. L. Hanover, New-Hampshire. Var. Precious garnet. In hornblende slate.

868. L. Pelham, Massachusetts. Var. Precious garnet. Loose crystals, in trapezohedra.
869. L. Craslau, Bohemia. Var. Precious garnet. Massive.
870. L. Mount Vesuvius. do. Crystallized and massive.
871. L. Sweden. Common garnet. Large single crystal.
872. L. New Fane, Vermont. Common garnet. do.
873. L. do. do. do.
874. L. do. do. In regular dodecahedra, imbedded in chlorite slate.
875. L. Salisbury, Connecticut. Common garnet. In dodecahedra, with their edges slightly replaced by single planes; associated with crystals of staurotide in mica slate.
876. L. Franconia, New-Hampshire. Common garnet. Massive and crystallized in highly modified crystals. With quartz and compact magnetic iron ore.
877. L. Mount Vesuvius. Common garnet. Crystallized and massive, with ice-spar.
878. L. Ticonderoga, New-York. Common garnet. Massive.
879. L. Hawley, Massachusetts. do. Amorphous.
880. L. Allathal, Tyrol. Var. Topazolite.
881. L. Ceylon. Var. Cinnamon stone. In grains.
882. L. Carlisle, Massachusetts. Var. Cinnamon stone. Crystallized.
883. L. Salisbury, Connecticut. do. Crystallized and massive.
884. L. Salisbury, Connecticut. do. Massive.
885. L. Norway. Var. Allochroite.
886. L. Sparta, New-Jersey. Var. Melanite. In dodecahedra.
887. L. do. do. do.
888. L. Mount Vesuvius. do. do. With ice-spar.
889. L. Cumberland, Rhode Island. Var. Grossular?
890. L. Bohemia. Var. Pyrope.
891. L. Haddam, Connecticut. Var. Manganesian garnet. In trapezohedral crystals, and massive.
892. L. do. do. do.

893. L. Haddam, Connecticut. Var. Manganesian garnet.
894. L. do. do. Massive.
895. L. do. do. Part of a crystal.
896. L. do. do. do.
897. L. Willsborough, New-York. Var. Colophonite. Color reddish brown.
898. L. Willsborough, New-York. do. Black. With tabular spar and coccolite.
899. L. Sweden. Var. Colophonite. Color yellow.

Sp. 4. *Prismatoidal Garnet.* Triv. Staurotide.

900. L. Brittany. A macled crystal, consisting of two crystals crossing each other at right angles.
901. L. Brittany. A macle of two crystals crossing each other at angles of 50° and 120°.
902. L. Plymouth, Vermont. Upon mica slate.
903. L. Chesterfield, Massachusetts. do.

Genus XII. Zircon.

Sp. 1. *Pyramidal Zircon.* Triv. Zircon.

904. L. Buncomb county, North Carolina. In loose crystals.
905. L. Expailly, France. Var. Hyacinth.
906. L. Beverly, Massachusetts. Var. Zirconite.
907. L. Carinthia. Var. Zirconite. A single prismatic crystal in zoisite.

Genus XIII. Gadolinite.

Sp. 1. *Prismatic Gadolinite.* Triv. Gadolinite.

908. L. Finbo, Sweden. In feldspar.

ORDER VIII. ORE.

Genus I. Titanium-Ore.

Sp. 1. *Prismatic Titanium-Ore.* Triv. Sphene.

909. L. Arendal, Norway. Titane siliceo calcaire ditetraèdre. H. Single crystal.

910. L. Tyrol. Massive and crystallized, in gneiss. Color yellow.

911. L. Bolton, Massachusetts. In dark brown crystals, like No. 909. Upon a large crystal of nuttallite, with crystals of pyroxene.

912. L. Ticonderoga, New-York. Like 909. With green pyroxene, plumbago, and minute crystals of apatite.

913. L. Forest of Dean, New-York. Massive, with lamellar pyroxene.

Sp. 2. *Peritomous Titanium-Ore.* Triv. Rutile. Chem. Oxide of Titanium.

914. L. Bohemia. In slender red prisms, in quartz.

915. L. Conway, Massachusetts. A single geniculated crystal.

916. L. Stubach, Tyrol. Crystallized, and massive, in quartz.

917. L. Craig-Caillarch, Scotland. In fibrous masses, upon quartz.

918. L. North Carolina. In distinct crystals, on quartz.

919. L. Hungary. Var. Nigrine.

920. L. Silesia. " Iserine.

Sp. 3. *Pyramidal Titanium-Ore.* Triv. Anatase.

921. L. Bourg d'osians, Dauphiné. In acute octahedra; color brown: translucent.

Genus II. Zinc-Ore.

Sp. 1. ————. Triv. Red Oxide of Zinc.

922. L. Sussex, New-Jersey. Massive; granular: color blood red; imbedded in a dull, brownish red substance, with a vitreous lustre, which has recently been analized

by Dr. Thompson, and found to be a new species. According to its composition, he calls it a *Silicate of Manganese.*

923. L. Sussex, New-Jersey. Lamellar, with franklinite and silicate of manganese.

Genus III. Copper-Ore.

Sp. 1. *Octahedral Copper-Ore.* Triv. Red Oxide of Copper.

924. L. Cornwall. In octahedra, with quartz.
925. L. do. Var. Capillary red oxide of copper.
926. L. do. " Massive red oxide of copper.
927. L. Siberia. " Earthy red oxide of copper.

Genus IV. Tin-Ore.

Sp. 1. *Pyramidal Tin-Ore.* Chem. Oxide of Tin.

928. L. St. Agnes, Cornwall. In yellow, transparent crystals; some of which belong to the forms, Etain oxydé soustractif, and Etain oxydé hémitrope. H.
929. L. Bohemia. Etain oxydé soustractif. H. In black crystals.
930. L. Bohemia. Etain oxydé hémitrope. H. Loose crystals.
931. L. Saxony. Black, crystallized, and in grains; imbedded in talc.
932. L. Banca, India. Var. Stream tin.
933. L. Cornwall. Var. Wood tin.

Genus V. Scheelium-Ore.

Sp. 1. *Prismatic Scheelium-Ore.* Triv. Wolfram.

934. L. Schlaggenwald, Bohemia. Crystallized in quartz.
935. L. Cornwall, England. do.
936 L. Munroe, Connecticut. Compact.
937. L. Trebitsch, Moravia. Granular.

GENUS VI. TANTALUM-ORE.

Sp. 1. *Prismatic Tantalum-Ore.* Triv. Columbite.

938. L. Chesterfield, Massachusetts. This substance has not yet been sufficiently examined to pronounce with certainty upon its nature. It appears, however, from its crystalline form, specific gravity, and other characters, to be the genuine Columbite.

GENUS VII. URANIUM-ORE.

Sp. 1. *Uncleavable Uranium-Ore.* Triv. Pitch Ore.

939. L. Joachimsthal, Bohemia.

GENUS VIII. CERIUM-ORE.

Sp. 1. *Uncleavable Cerium-Ore.* Triv. Cerite.

940. L. Westmanland, Sweden.

GENUS IX. CHROME-ORE.

Sp. 1. *Octahedral Chrome-Ore.* Triv. Chromate of Iron.

941. L. Bare Hills, near Baltimore. In loose octahedral crystals.

942. L. do. Massive.

GENUS X. IRON-ORE.

Sp. 1. * * * * * *

Sp. 2. *Octahedral Iron-Ore.* Triv. Oxydulated Iron-Ore.

943. L. Mount Grainer, Tyrol. In octahedral crystals, in chlorite.

944. L. Munroe, New-York. do. and massive.

945. L. Sweden. In octahedral crystals, in chlorite slate.

946. L. do. Granular, and variegated.

947. L. Munroe. Massive, and exhibiting sections of octahedra upon its surface.

948. L. New-Jersey. Var. Native loadstone. Highly magnetic.
949. L. Norburg, Sweden. Massive, with hornblende.
950. L. Franconia, New-Hampshire. Compact, with hornblende.
951. L. Nova Scotia. Compact, with impressions of shells.

Sp. 3. *Dodecahedral Iron-Ore.* Triv. Franklinite.

952. L. Sussex, New-Jersey. In irregular octahedra, with red oxide of zinc.
953. L. do. do.
954. L. do. Massive and compact, with a coating of carbonate of zinc.

Sp. 4. *Rhombohedral Iron-Ore.* Triv. Specular Iron Ore.

955. L. Framont, Lorraine. Fer oligiste dodécahèdre. H. In tarnished crystals.
956. L. Elba. In highly modified crystals.
957. L. Framont, Lorraine. Crystallized, like 955.
958. L. Cumberland, England. Lamelliform.
959. L. Oravitza, Bannat. Var. Micaceous iron ore.
960. L. Elba. do.
961. L. Nova Scotia. do.
962. L. Hawley, Massachusetts. do.
963. L. Vermont. do.
964. L. do. do.
965. L. Mount Vesuvius. Var. Volcanic specular iron ore.
966. L. Lorraine. Var. Fibrous red haematite.
967. L. do. do. Mammillary.
968. L. Pennsylvania. Var. Compact red iron ore.
969. L. Friscau, Lower Austria. Var. Jaspery iron ore.
970. L. New-York. Var. Scaly red iron ore. With impressions of several shells.
971. L. Bohemia. Var. Columnar clay iron stone.
972. L. Richmond, Massachusetts. Var. Red ochre.
973. L. Cornwall. Var. Reddle.

Sp. 5. *Prismatic Iron-Ore.* Triv. Hydrous Oxide of Iron. Brown Iron Ore.

974. L. Siberia. In fibres upon quartz crystals.
975. L. Salisbury, Connecticut. Var. Fibrous brown haematite.
976. L. do. " Brown and black haematite. Fibrous, mammillary, and stalactitical.
977. L. do. do. do.
978. L. Austria. Var. Brown and black haematite. Botryoidal and stalactitical.
879. L. Lorraine. In columnar masses. (Black haematite of Phillips.)
980. L. Lorraine. Var. Compact brown iron ore.
981. L. Sardinia. " Yellow ochre.
982. L. Switzerland. Var. Pisiform clay iron stone.
983. L. Vermont. do. Loose.
984. L. New Braintree, Massachusetts. Var. Bog iron ore. Common iron ore. Deposited around vegetables.
985. L. Connecticut. do.

Sp. 6. *Di-prismatic Iron Ore.* Triv. Yenite.

986. L. Cumberland, Rhode Island. In prismatic crystals penetrating quartz.
987 L. Elba. Massive.
988. L. Chatham, Connecticut. See American Journal, vol. viii. p. 59. Not well ascertained.

GENUS XI. MANGANESE-ORE.

Sp. 1. * * * *

Sp. 2. *Uncleavable Manganese Ore.* Triv. Black Haematite.

989. L. Saxony. Var. Grey oxide of manganese. Botryoidal and compact.
990. L. Bennington, Vermont. do. Compact.
991. L. France. do. With fluor.
992. L. Devonshire. Var. Wad.

Sp. 3. *Prismatoidal Manganese-Ore.*

993. L. Transylvania. Var. Grey manganese-ore. Crystallized.
994. L. do. do.
995. L. do. do.

ORDER IX. METAL.

Genus I. Arsenic.

Sp. 1. *Native Arsenic.*

996. L. Saxony. Exhibiting cavities in the form of the cube and the octahedron.

Genus II. Tellurium.

Sp. 1. *Native Tellurium.*

997. L. Facebay, Transylvania. In distinct crystals, with blende.

Genus III. Antimony.

Sp. 1. *Rhombohedral Antimony.* Triv. Native Antimony.

998. L. Allemont, France. Massive.

Sp. 2. *Prismatic Antimony.* Triv. Antimonial Silver?

999. L. St. Marie. Crystallized in six-sided prisms, which, according to Count Bournon, are not regular. In calcareous spar.

Genus IV. Bismuth.

Sp. 1. *Octahedral Bismuth.* Triv. Native Bismuth.

1000. L. Joachimstal, Bohemia. In grains, approaching the octahedron in shape.
1001. L. Huntington, Connecticut. Massive, in quartz.

Genus V. Mercury.

Sp. 1. *Dodecahedral Mercury.* Triv. Native Amalgam.

1002. L. Hungary. Upon limestone.

Sp. 2. *Fluid Mercury.* Triv. Native Mercury.

1003. L. Idria. With iron pyrites in bituminous shale.

GENUS VI. SILVER.

Sp. 1. *Hexahedral Silver.* Triv. Native Silver.

1004. L. Wellichen, Fustenberg. Crystallized and massive. The crystals being imperfect elongated octahedra.

1005. L. Kongsberg, Norway. Capillary and ramose.

GENUS VII. GOLD.

Sp. 1. *Hexahedral Gold.* Triv. Native Gold.

1006. L. Vorospatask, Transylvania. In minute crystals, and arborescent. In porphyry.

1007. L. Abendbanya, Transylvania. Foliated.

1008. L. Siberia. Massive; color bright yellow.

GENUS VIII. PLATINA.

Sp. 1. *Native Platina.*

1009. L. Brazil. In minute flattened grains.

GENUS IX. IRON.

Sp. 1. *Octahedral Iron.* Triv. Native Iron.

1010. L. Canaan, Connecticut. In irregular oblique tetrahedra; the result of cleavage. See American Journal, vols. xii. and xiv.

1011. L. Siberia. Var. Meteoric iron. Containing prismatic crysolite.

GENUS X. COPPER.

Sp. 1. *Octahedral Copper.* Triv. Native Copper.

1012. L. Cornwall. In irregular octahedra.

1013. L. do. do. With quartz.

1014. L. Siberia. do.

ORDER X. PYRITES.

Genus I. Nickel-Pyrites.

Sp. 1. *Prismatic Nickel-Pyrites.* Triv. Copper-Nickel.

1015. L. Schlademing, Stiria. Massive; with green oxide of nickel and white cobalt.

Genus II. Arsenical-Pyrites.

Sp. 1. * * * * * *

Sp. 2. *Prismatic Arsenical Pyrites.* Triv. Mispeckel.

1016. L. Saxony. Loose crystals: form rhombic prisms, with diedral summits.

1017. L. Saxony. Loose crystals. Fer arsenical unibinaire. H.

1018. L. Franconia. In prismatic crystals, in gneiss.

1019. L. Huntington, Connecticut. Massive.

Genus III. Cobalt-Pyrites.

Sp. 1. *Octahedral Cobalt-Pyrites.* Triv. Bright white Cobalt.

1020. L. Tunaberg, Sweden. In loose crystals: form the pentagonal dodecahedron.

1021. L. Tunaberg, Sweden. Crystals imbedded in copper pyrites.

1022. L. do. Massive.

1023. L. Saxony. Var. Grey cobalt.

Sp. 2. *Hexahedral Cobalt-Pyrites.* Triv. Tin white Cobalt.

1024. L. Schneeberg, Saxony. In cubes and octahedrons.

Genus IV. Iron-Pyrites.

Sp. 1. *Hexahedral Iron-Pyrites.* Triv. Iron-Pyrites.

1025. L. Cornwall, England. In octahedra, with their solid angles truncated.

1026. L. Elba. In loose crystals, in pentagonal dodecahedra.
1027. L. do. Fer sulfure cubododécahèdre. H.
1028. L. Cumberland, England. Loose crystal.
1029. L. do. In cubes, imbedded in clay slate.
1030. L. England. In cubes upon quartz, with pearl spar.
1031. L. Siberia. Var. Auriferous iron pyrites.

Sp. 2. *Prismatic Iron-Pyrites.* Triv. White Iron Pyrites in part. Cockscomb and Hepatic Pyrites.

1032. L. England. Var. Cockscomb pyrites.
1033. L. Saxony. " Spear pyrites.
1034. L. Baygorry. " Hepatic iron pyrites.
1035. L. Ohio. " Globular iron pyrites.
1036. L. Saxony. " Radiated iron pyrites.

Sp. 3. *Rhombohedral Iron-Pyrites.* Triv. Magnetic Iron Pyrites.

1037. L. Snowdon, Wales.
1038. L. Huntington, Connecticut.

GENUS V. COPPER-PYRITES.

Sp. 1. *Octahedral Copper-Pyrites.* Triv. Purple Copper.

1039. L. Gzicklowa, Bannat. Massive.

Sp. 2. *Pyramidal Copper-Pyrites.* Triv. Copper-Pyrites.

1040. L. Germany. Crystallized and massive, with quartz: color variegated.
1041. L. Germany. In distinct tetrahedra, with their solid angles truncated.
1042. L. Germany. Var. Variegated copper pyrites.
1043. L. England. Botryoidal copper pyrites.
1044. L. do. Compact and massive.

ORDER XI. GLANCE.

Genus I. Copper-Glance.

Sp. 1. *Tetrahedral Copper-Glance.* Triv. Fahlerz.

1045. L. Schemnitz, Hungary. In highly modified tetrahedra, with crystallized carbonate of iron, and massive copper pyrites.

1046. L. Schemnitz, Hungary. do.

Sp. 2. * * * * *

Sp. 3. *Di-prismatic Copper-Glance.* Triv. Bournonite.

1047. L. Kapnick, Transylvania. Crystallized in rectangular prisms, highly modified, and accompanied with deep red crystals of phosphorescent blende.

Sp. 4. *Prismatic Copper-Glance.* Triv. Vitreous Copper.

1048. L. Cornwall. Crystallized.

1049. L. Schmolnitz, Moravia. Granular.

1050. L. England. Massive, and compact.

1051. L. Cornwall. Massive, and variegated.

Genus II. Silver-Glance.

Sp. 1. *Hexahedral Silver-Glance.* Triv. Vitreous Silver.

1052. L. Dauphiné. Massive; with native silver and arseniate of cobalt.

Genus III. Lead-Glance.

Sp. 1. *Hexahedral Lead-Glance.* Triv. Galena.

1053. L. Derbyshire. In cubes, with the solid angles truncated; accompanied by white fluor.

1054. L. Derbyshire. In octahedra, with the solid angles truncated.

1055. L. Leicestershire. Corroded crystals of galena. Upon carbonate of lime.

1056. L. Massachusetts. Massive.
1057. L. Missouri. Massive.
1058. L. do. Massive; with sulphate of barytes.
1059. L. do. Massive; with a cavity containing carbonate of lead.
1060. L. Derbyshire. Massive.
1061. L. Missouri. Granular.
1062. L. England. do.
1063. L. Devonshire. Var. Argentiferous galena.
1064. L. Derbyshire. " Specular galena. Slickensides.

GENUS IV. TELLURIUM-GLANCE.

Sp. 1. *Prismatic Tellurium-Glance.* Triv. Black Tellurium.

1065. L. Nagyag, Transylvania.

GENUS V. MOLYBDENA-GLANCE.

Sp. 1. *Prismatic Molybdena-Glance.* Chem. Sulphuret of Molybdena.

1066. L. Lancaster, Massachusetts. Foliated; in granite.
1067. L. Brunswick, Maine. do. do.
1068. L. Bohemia. do. in quartz.

GENUS VI. BISMUTH-GLANCE.

Sp. 1. *Prismatic Bismuth-Glance.* Chem. Sulphuret of Bismuth.

1069. L. Saxony. Massive.

GENUS VII. ANTIMONY-GLANCE.

Sp. 1. *Prismatic Antimony-Glance.* Triv. Graphic Gold.

1070. L. Nagyag, Transylvania.

Sp. 2. *Prismatoidal Antimony-Glance.* Chem. Sulphuret of Antimony.

1071. L. France. In prismatic crystals, with tabular crystals of sulphate of barytes.

1072. L. France. In flattened prisms.
1073. L. Saxony. In radiating prisms upon quartz.
1074. L. do. In capillary crystals.
1075. L. France. Massive, and in radiating fibres.

Genus VIII. Melane-Glance.

Sp. 1. *Prismatic Melane-Glance.* Triv. Brittle Sulphuret of Silver.

1076. L. Saxony. Massive.
1077. L. Hungary. Var. Flexible sulphuret of silver.

ORDER XII. BLENDE.

Genus I. Glance-Blende.

Sp. I. *Hexahedral Glance-Blende.* Triv. Schwarzerz.

1078. L. Kapnik, Transylvania. Massive; in siliceous oxide of manganese.

Genus II. Garnet-Blende.

Sp. 1. *Dodecahedral Garnet-Blende.* Triv. Blende.

1079. L. Cumberland, England. In blackish, loose crystals, accompanied by iron pyrites.
1080. L. Przibram, Bohemia. Color blackish; in crystals with quartz.
1081. L. Kapnik, Transylvania. In brown crystals; phosphoresces on friction with a knife.
1082. L. England. Color brown. Crystallized.
1083. L. do. do. With fluor.
1084. L. do. Color yellow. Massive.
1085. L. Southampton, Massachusetts. With galena.
1086. L. Przibram, Bohemia. Fibrous blende. It probably contains cadmium; since nearly all fibrous blendes have, of late, been found to contain this metal.

Genus III. Purple-Blende.

Sp. 1. *Prismatic Purple-Blende.* Triv. Red Antimony.

1087. L. Hungary. In radiating fibres, with grey antimony ore.

Genus IV. Ruby-Blende.

Sp. 1. *Rhombohedral Ruby-Blende.* Triv. Red Silver.

1088. L. Saxony. Crystallized, and massive.

Sp. 2. * * * * *

Sp. 3. *Peritomous Ruby-Blende.* Triv. Cinnabar.

1089. L. Idria. Crystallized, and massive.
1090. L. Deuxponts. Massive.
1091. L. Idria. Compact.
1092. L. do. do. With iron pyrites.
1093. L. Carinthia. Friable and red.

ORDER XIII. SULPHUR.

Genus I. Sulphur.

Sp. 1. *Prismatoidal Sulphur.* Triv. Yellow Orpiment.

1094. L. Tajowa, Lower Hungary. Lamellar.

Sp. 2. *Hemi-prismatic Sulphur.* Triv. Red Orpiment.

1095. L. Kapnik, Transylvania. Crystallized, with blende and copper pyrites.

Sp. 3. *Prismatic Sulphur.* Triv. Sulphur.

1096. L. Bex, Switzerland. Massive, with crystals of sulphate of strontian on carbonate of lime.
1097. L. Bex, Switzerland. Crystallized, and massive.
1098. L. Italy. Var. Volcanic sulphur.

APPENDIX TO CLASS II.

1099. Allophane. L. Schneeberg, Saxony.
1100. Aphrite. L. Saxony.
1101. Atacamite. Muriate of copper. Crystallized, and massive. L. Chili, Peru.
1102. Brewsterite, with chabasie. L. Strontian, Scotland.
1103. Calaite. Turquoise. L. Persia.
1104. Chiastolite. In clay slate. L. Lancaster, Massachusetts.
1105. do. do. (reddish) do.
1106. do. A loose crystal. do.
1107. do. do. do.
1108. do. do. do.
1109. do. do. do.
1110. do. do. do.
1111. do. do. do.
1112. do. In mica slate. L. Bellow's Falls, Vermont.
1113. do. In clay slate. L. Lancaster, Massachusetts.
1114. do. do. L. Hartz.
1115. do. do. In acicular crystals. L. Cumberland, England.
1116. Chloropal. L. Ribouk, Hungary.
1117. Chlorophaeite. In greenstone. L. Gill, Massachusetts.
1118. do. do. do.
1119. Chondrodite. Brucite. In carbonate of lime; yellow. L. Sparta, New-Jersey.
1120. Chondrodite. do. Reddish. L. Amity, New-York.
1121. Chondrodite. do. L. Orange, N.York.
1122. do. do. (red) do.
1123. do. do. With spinelle. L. Boxborough, Massachusetts.
1124. Comptonite, in small transparent crystals. Form a right square prism, with dihedral summits. L. Mount Vesuvius.
1125. Cupreous Bismuth. L. Siberia.

1126. Elaolite. L. Norway.
1127. Fahlunite. L. Sweden.
1128. Fibrolite. L. Bellows Falls, Vermont.
1129. do. L. Delaware.
1130. do. L. Lancaster, Massachusetts.
1131. do. L. New-Hampshire.
1132. Figure-stone. Agalmatolite. L. India.
1133. do. L. Hungary.
1134. Gehlenite. Crystallized, and imbedded in carbonate of lime. L. Fassa, Tyrol.
1135. Gibbsite, stalactitical. L. Richmond, Massachusetts.
1136. do. Upon haematite. do.
1137. do. Upon black haematite. do.
1138. Haüyne, in lava. L. Lake Laach.
1139. Humboldtine. L. Bohemia.
1140. Hydrate of Magnesia. L. Hoboken, New-Jersey.
1141. do. do.
1142. Indianite, with corundum. L. Carnatic.
1143. Karpholite. L. Schlaggenwald, Bohemia.
1144. Killinite. L. Killiney, Ireland.
1145. Magnesite. Earthy and crystallized. L. Hoboken, New-Jersey.
1146. do. Earthy and fibrous. do.
1147. do. do. do.
1148. do. Fibrous. do.
1149. do. Var. Meerchaum. L. Archipelago.
1150. do. Pulverulent. L. Hoboken, New-Jersey.
1151. Marmolite, with serpentine. do.
1152. do. do. do.
1153. Mellilite, with sommite. L. Near Rome.
1154. Native Nickel. In capillary crystals. L. Bohemia.
1155. Nephrite. L. Smithfield, Rhode Island.
1156. do. L. Easton, Pennsylvania.
1157. do. do.
1158. Nuttallite. L. Bolton, Massachusetts.
1159. do. In carbonate of lime. L. Bolton, Massachusetts.

1160. Orthite. In Feldspar. L. Sweden.
1161. Pharmacolite. L. Hessia.
1162. Phosphate of Manganese. L. France.
1163. do. L. Washington, Connecticut.
1164. do. do.
1165. Pitchy Iron Ore. L. Schneeberg, Saxony.
1166. Pinite. L. France.
1167. do. L. Lancaster, Massachusetts.
1168. Pyrallolite? In carbonate of lime. L. Bolton, Massachusetts.
1169. do. do.
1170. do. do.
1171. Saussurite, with smaragdite. L. Corsica.
1172. Serpentine (noble.) L. Newburyport, Massachusetts.
1173. do. " L. Hoboken, New-Jersey.
1174. do. " L. Kellyvale, Vermont.
1175. do. L. New-Milford, Connecticut.
1176. do. L. Hungary.
1177. do. L. Phillipstown, New-York.
1178. Sillimanite, in gneiss. L. Saybrook, Connecticut.
1179. do. do.
1180. do. do.
1181. Spherulite, in Pearl-stone. L. Schemnitz.
1182. Steatite. Crystallized. (Apparently pseudimorphs of quartz.) With a dodecahedral crystal of magnetic iron ore. L. Middlefield, Massachusetts.
1183. Steatite, or Soapstone. L. China.
1184. do. do.
1185. do. L. Saxony.
1186. do. L. Vermont.
1187. do. Var. Potstone. L. Bolton, Massachusetts.
1188. Stilpnosiderite. L. Saxony.
1189. Thompsonite, with analcime. L. Scotland.
1190. Tin Pyrites. L. St. Agnes, Cornwall.
1191. Wavellite. On clay slate. L. Devonshire, England.
1192. do. do. do.
1193. do. On grit. L. Bohemia.

1194. Yttrocerite. L. Finbo, Sweden.
1195. Zeagonite, in lava. L. Mount Vesuvius.

Minerals which will probably never form distinct species in the mineral system.

1196. Adhesive slate. L. Menil Montant.
1197. Alum slate. L. Palatinate.
1198. Bituminous Shale. L. Pennsylvania.
1199. do. L. Enfield, Connecticut.
1200. Bole. Containing calcedony. L. Giants' Causeway.
1201. Clay stone. L. Connecticut.
1202. Common clay. White. L. Martha's Vineyard.
1203. do. Brown. do.
1204. do. Red. do.
1205. do. Yellow. do.
1206. do. Very friable. do.
1207. Drawing slate. L. Pawtucket, Rhode Island.
1208. Fullers' earth. L. England.
1209. Lithomarge. L. Saxony.
1210. Polishing slate. L. Near Hartford, Connecticut.
1211. Tripoli. L. Unknown.
1212. Umber. L. Cyprus.

Minerals not mentioned in Mohs' system, but which are described in Phillips' Mineralogy, either as varieties, or distinct species; and which fall under Class II., or among the list above given.

1213. Clay slate. L. Woodbridge, Connecticut.
1214. do. do.
1215. do. L. Vermont.
1216. do. L. Devonshire, England.
1217. do. L. Vermont.
1218. do. do.
1219. Wacké? with basalt. L. Giant's Causeway.
1220. Iron clay. L. Connecticut.
1221. Indurated clay. L. New-York.
1222. Shale. With vegetable impressions. L. Rhode Island.

1223. Rottenstone. L. England.
1224. Potters' clay. L. Sèvre, France.
1225. Pipe clay. L. Unknown.
1226. Loam, or brick clay. L. East Haven.
1227. Kollyrite. L. Schemnitz, Hungary.
1228. Lava. L. Mount Vesuvius.
1229. do. do.
1230. do. do.
1231. do. do.
1232. do. do.
1233. do. do.
1234. do. do.
1235. do. do.
1236. do. do.
1237. do. do.
1238. do. do.
1239. do. do.
1240. Clink stone. L. New-Haven, Connecticut.
1241. Domite. L. Puy de Dome, France.
1242. Omphacite. With garnets. L. Bayreuth.
1243. Limbilite. With augite and calcedony. L. Limbourg.
1244. Pimelite. In serpentine. L. Silesia.
1245. Nickel ochre. With arsenical cobalt, garnet, hornblende, and galena. L. Chatham, Connecticut.
1246. Oxide of Chrome. L. Shetland Isles.
1247. Yellow Oxide of Tungsten. With tungstate of lime, in quartz. L. Huntington, Connecticut.
1248. Yellow Oxide of Tungsten. L. Huntington, Connecticut.

Minerals not mentioned by Phillips or Mohs; belonging to Class II.

1249. Nemolite. L. Hoboken, New-Jersey.
1250. Cummingtonite. L. Cummington, Massachusetts.
1251. do. do.
1252. do. do.
1253. Brittle Talc-Mica. In schiller spar. This substance has not yet been described. It is a mineral related on the

one hand to mica, and on the other to talc. L. Blandford, Massachusetts.

1254. Brittle Talc-Mica. L. Blandford, Massachusetts.

1255. Dysluite, or Manganesian Spinelle, in octahedral crystals in calcareous-spar. L. Sparta, New-Jersey.

1256. Deweyite. A siliceous hydrate of magnesia. L. Middlefield, Massachusetts.

1257. * * * * *. Not yet examined. L. Blandford, Massachusetts.

CLASS III.

ORDER I. RESIN.

Genus I. Melichrone-Resin.

Sp. 1. *Pyrimidal Melichrone-Resin.* Triv. Mellite.

1258. L. Thuringia. In loose octahedra.

Genus II. Mineral-Resin.

Sp. 1. *Yellow Mineral-Resin.* Triv. Amber.

1259. L. Coasts of the Baltic.

1260. L. do. Polished.

Sp. 2. *Black Mineral-Resin.* Triv. Mineral Oil. Bitumen.

1261. L. New-York. Naptha from the distillation of mineral oil.

1262. L. Barbadoes. Var. Barbadoes tar.

1263. L. Derbyshire. Var. Elastic bitumen.

1264. L. France? Compact mineral pitch.

1265. L. Trinidad. Var. Asphalt.

1266. L. Unkown. Slaty mineral pitch.

ORDER II. COAL.

Genus I. Mineral-Coal.

Sp. 1. *Bituminous Mineral-Coal.*

1267. L. Hungary. Var. Bituminous wood.
1268. L. England. Slaty.
1269. L. Virginia. do.
1270. L. England. do. With iron pyrites.
1271. L. Pittsburg. do.
1272. L. England. Fibrous and columnar.
1273. L. Richmond, Virginia. Columnar, and variegated.
1274. L. England. Cannel coal.

Sp. 2. *Non-bituminous Mineral-Coal.* Triv. Anthracite.

1275. L. Portsmouth, Rhode Island. Columnar.
1276. L. Wilkesbarre, Pennsylvania. Compact and iridescent.
1277. L. Lehigh, Pennsylvania. Compact.
1278. L. do. do.
1279. L. do. do. and tarnished.
1280. L. do. do. do.
1281. Portsmouth, Rhode Island. Slaty anthracite.

APPENDIX TO CLASS III.

1282. Retinasphalt. L. Delaware.
1283. Fossil copal? L. Owyhee.

Minerals accidentally omitted in the Catalogue, and belonging to Class II.

1284. Chabasie. L. New-Haven.
1285. do. do.
1286. Brown spar. L. Florida, New-York.
1287. Pearl-spar. L. England.
1288. Beryl. L. Bowdoinham, Maine.
1289. Sahlite. L. Munroe, New-York.
1290. From the mass which contained the *Barystrontianite.* L. Stromness, Orkney.

1291. Flesh colored stilbite. L. Tyrol.
1292. Fibrous schorl. L. Bellows Falls, Vermont.
1293. Blue corundum. L. New-Jersey.
1294. Krokalite. L. Transylvania.
1295. Chlorite slate. L. Tyrol.
1296. "Petit Sable." L. Sèvre.
1297. Black mica. L. Haddam, Connecticut.
1298. Arsenical silver. L. Hartz.
1299. Serpentine. L. Saxony.
1300. Prase. L. Cumberland, Rhode Island.
1301. Pseudimorphous quartz. In small six-sided prisms, terminated by trihedral summits. L. Southampton, Massachusetts.
1302. Axinite, with epidote. L. Dauphiné.
1303. Sapphire, or blue corundum. L. New-Jersey.
1304. Cyanite. L. Connecticut.
1305. Staurotide, upon mica slate. L. Maine.
1306. Black spinelle, or pleonaste. L. Warwick, New-Jersey.
1307. Basalt. L. Ireland.
1308. do. do.
1309. Nephrite. L. Smithfield, Rhode Island.
1310. Axestone. L. New Zealand.

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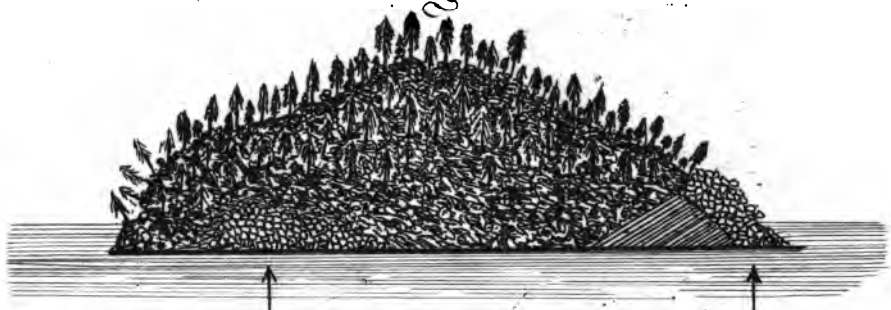
SOLAR SPOTS.

Among the Plates there will be found Diagrams, representing the Position and Number of the SOLAR SPOTS *which were observed from Cape Diamond, in* 1816, 17, *and* 18, *by Mr. Watts.—Their accuracy may be relied upon.*

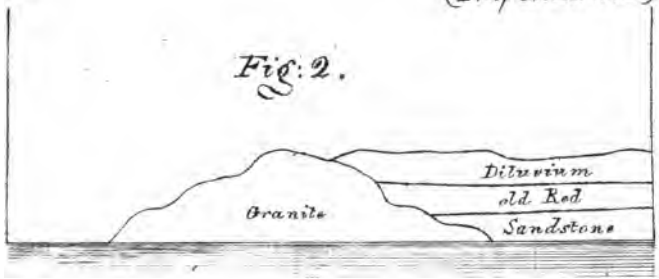
Fig: 1.



{Colums of Basaltic Trap Greenstone}

{Columns of Basaltic Trap Greenstone from 1½ Feet to 10 Inches in Diameter}

Fig: 2.



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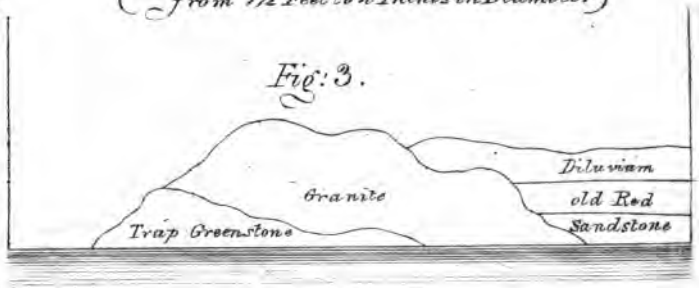


LAKE SUPERIOR.

Fig: 4.

LAKE SUPERIOR

Fig: 5

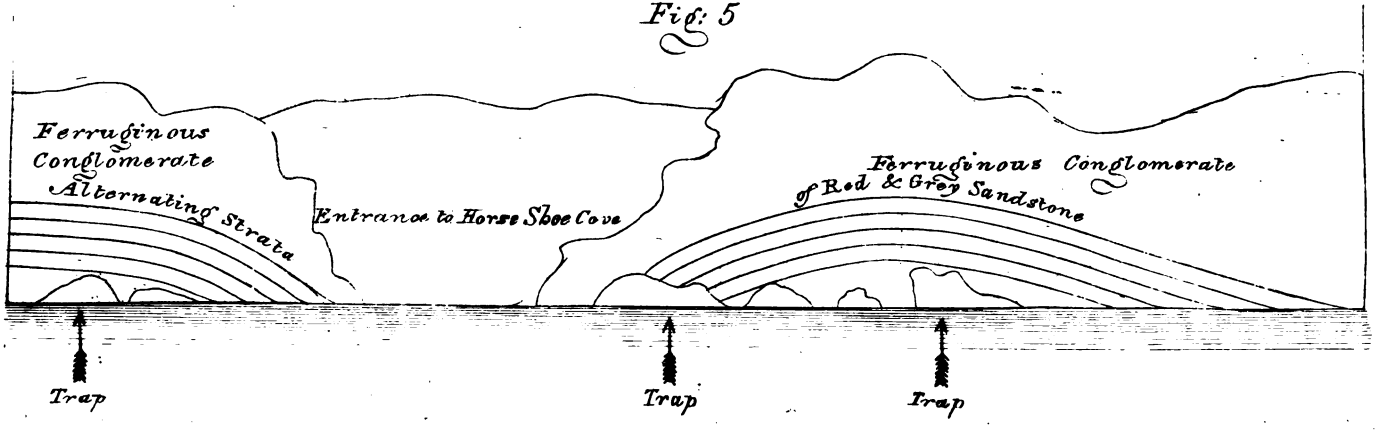
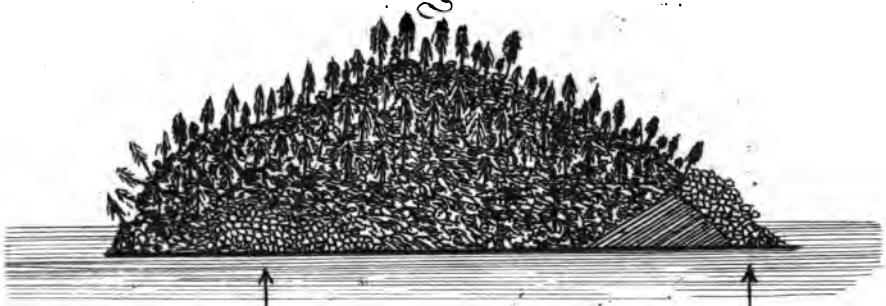


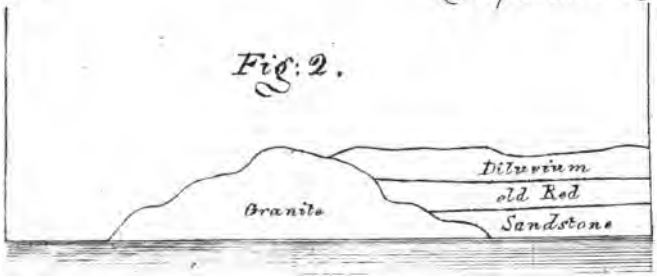
Fig: 1.



{Colums of Basaltic Trap Greenstone}

{Colums of Basaltic Trap Greenstone from 1½ Feet to 10 Inches in Diameter}

Fig: 2.



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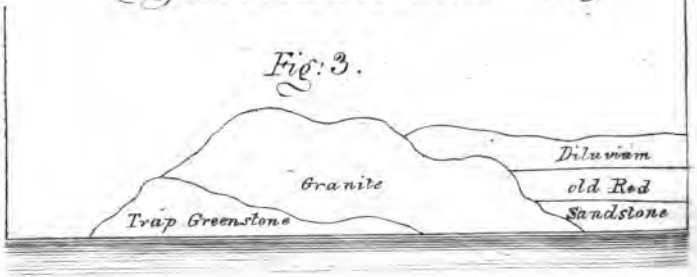


LAKE SUPERIOR.

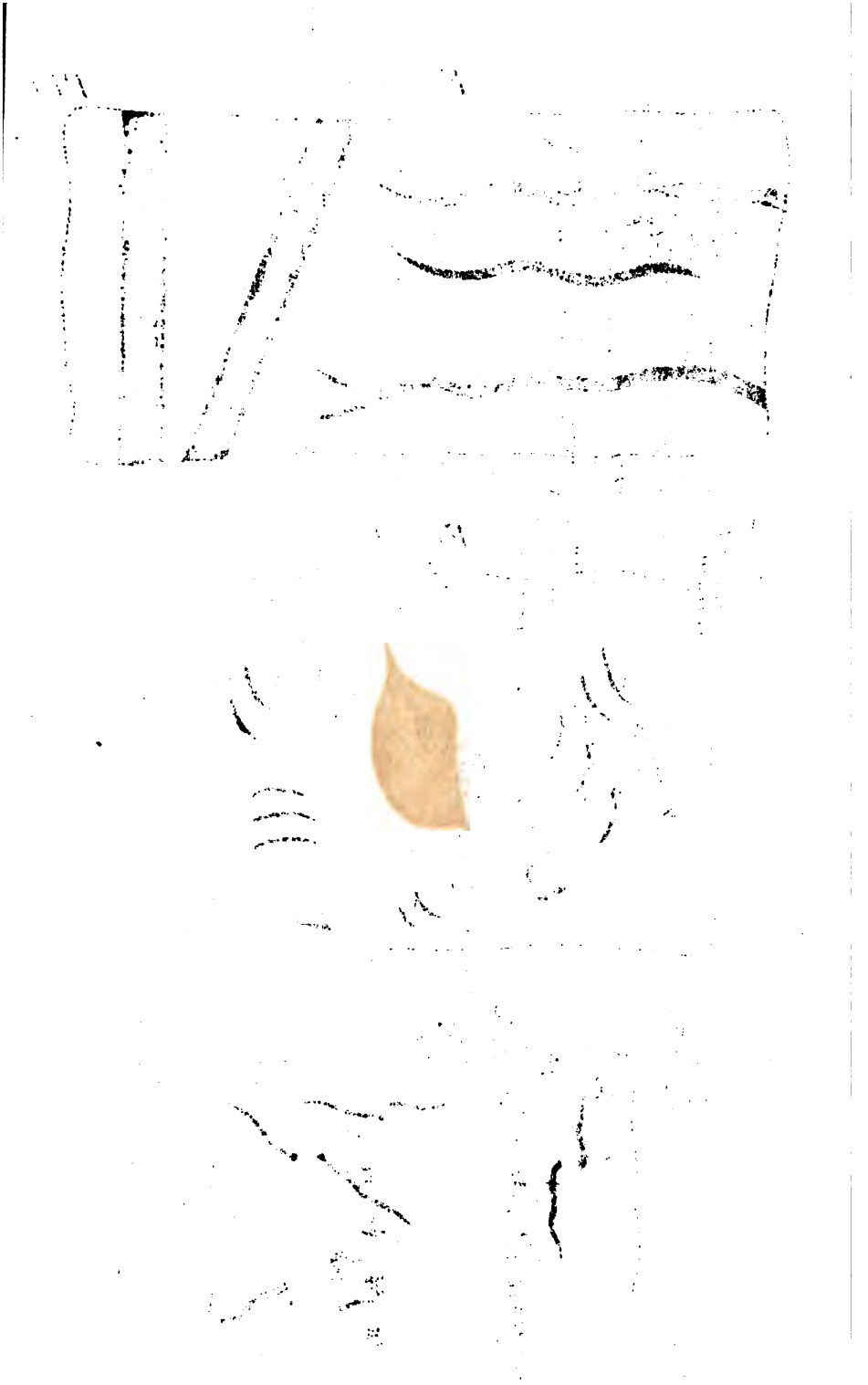
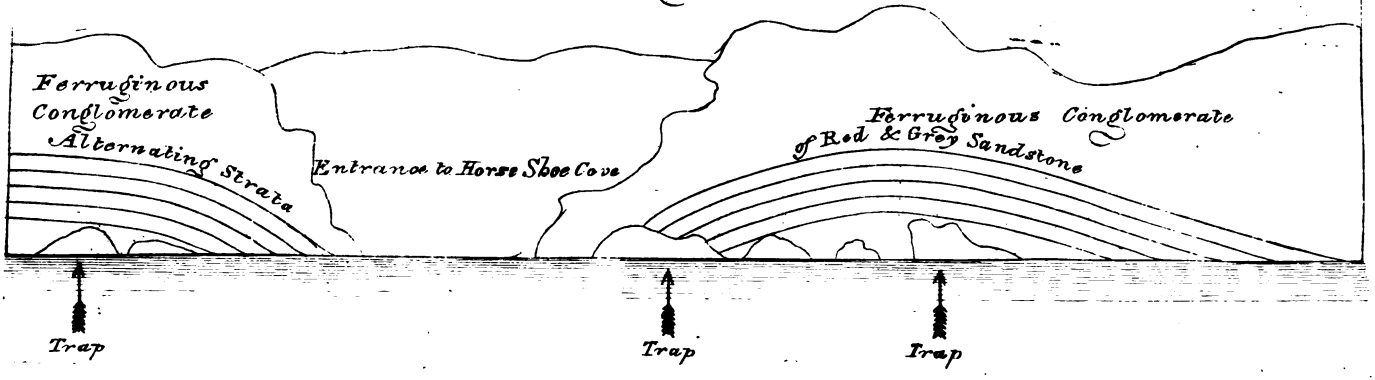


Fig: 4.

LAKE SUPERIOR

Fig: 5



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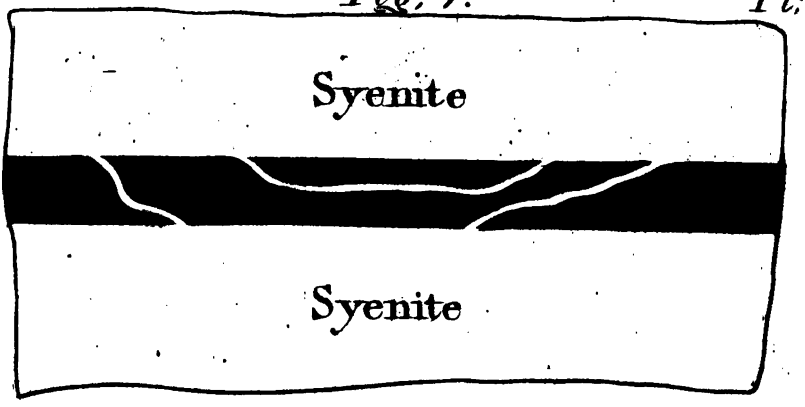

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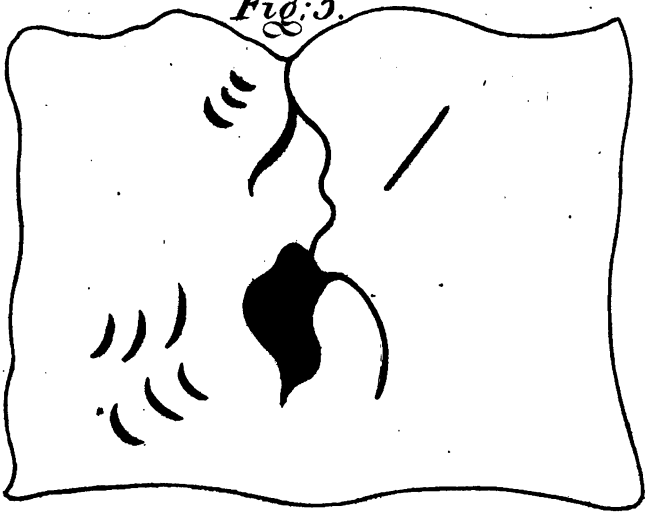

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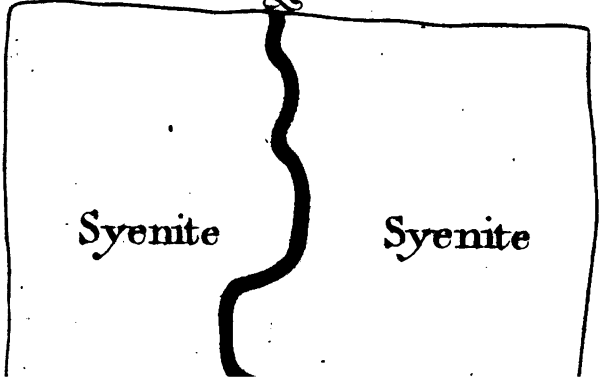


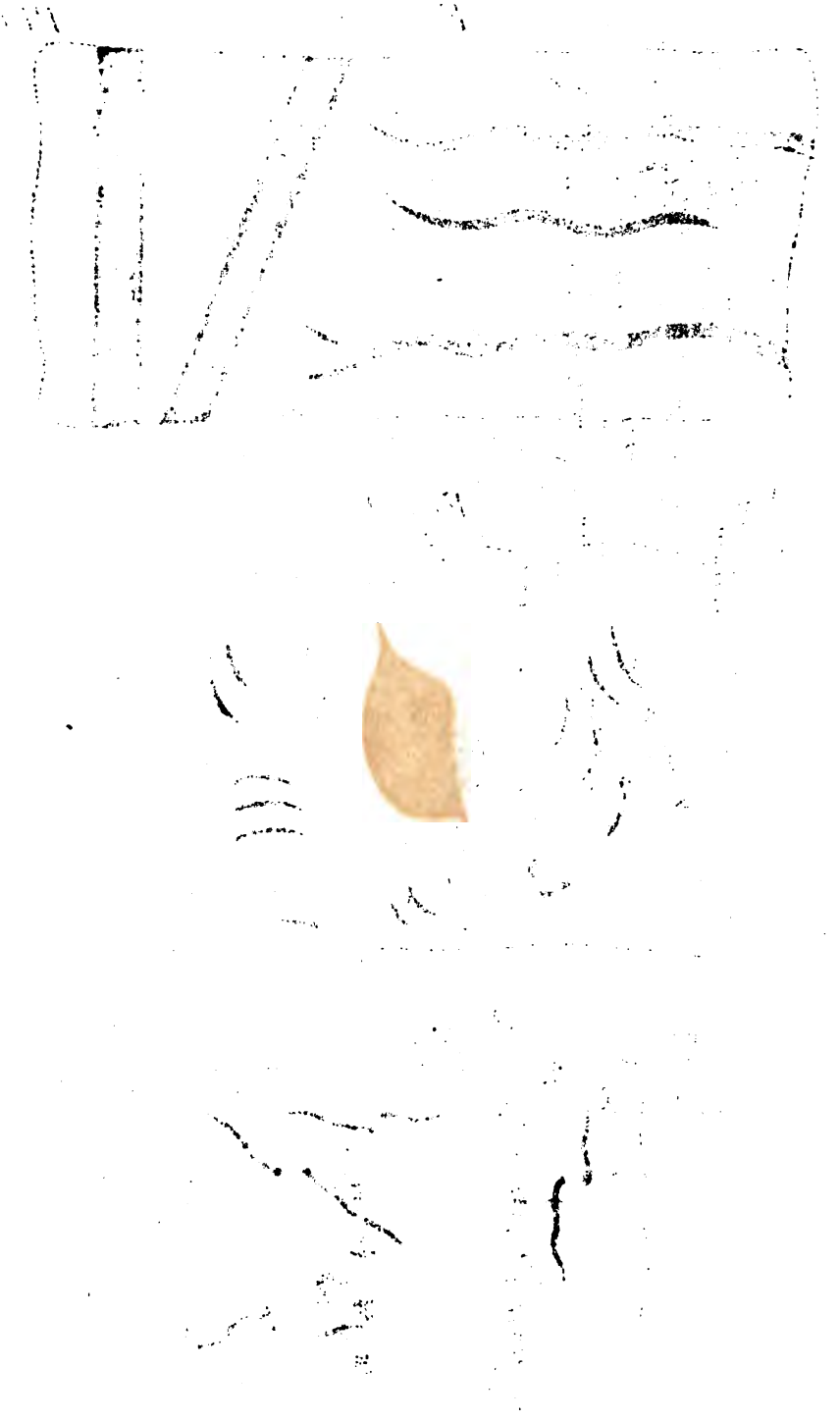
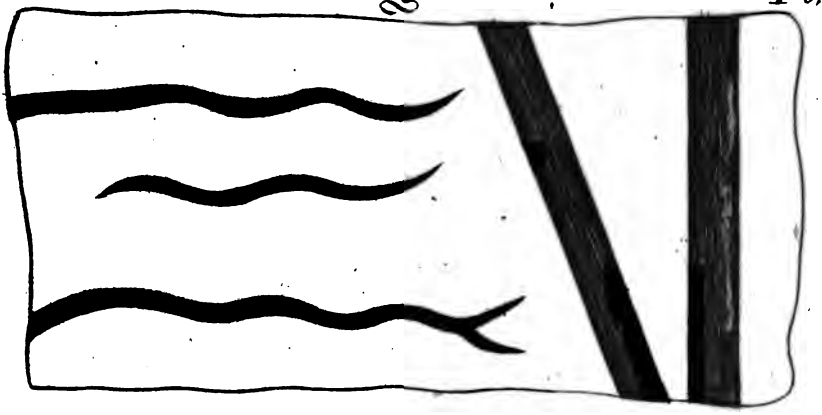


Fig: 1. Pl: 6



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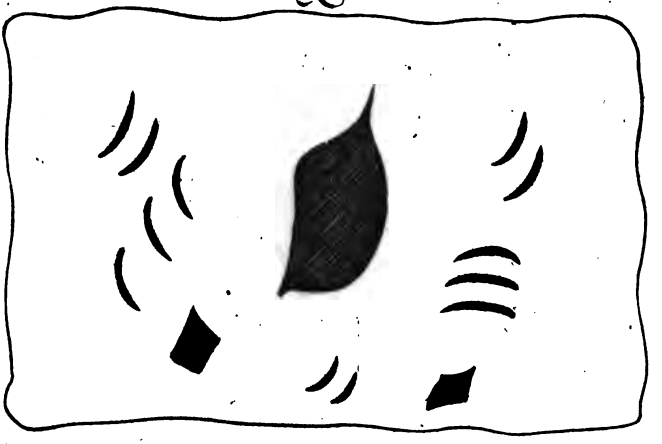

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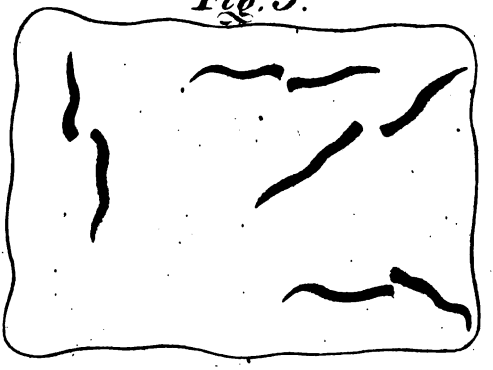

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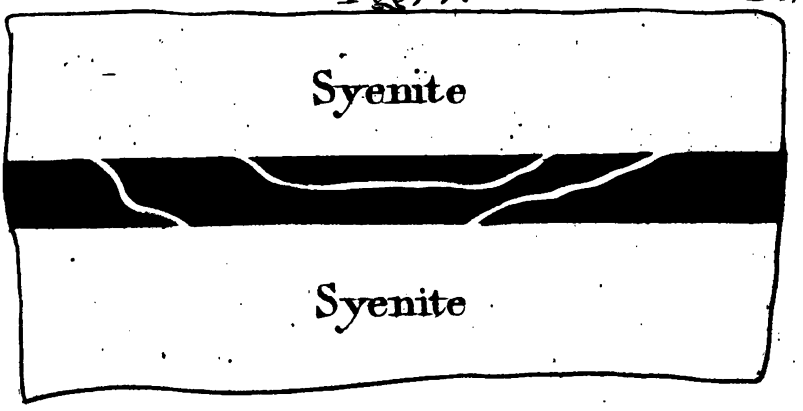

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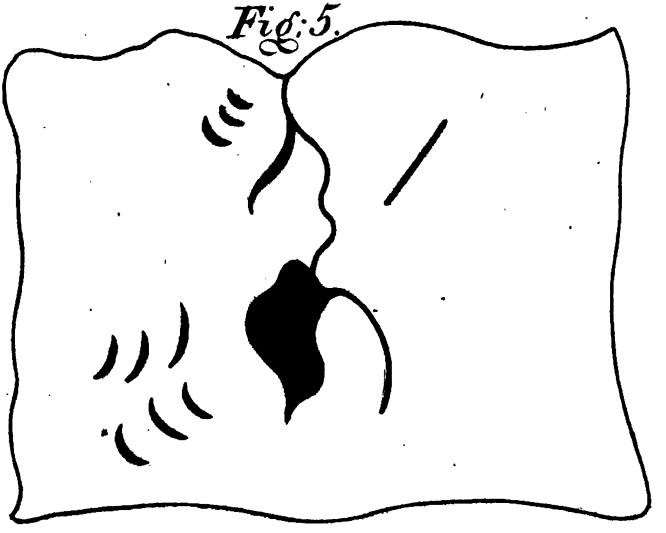

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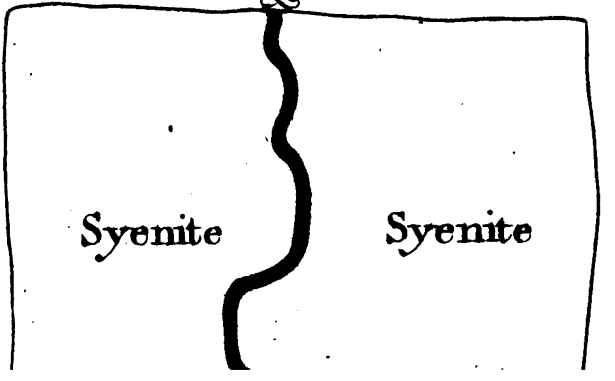
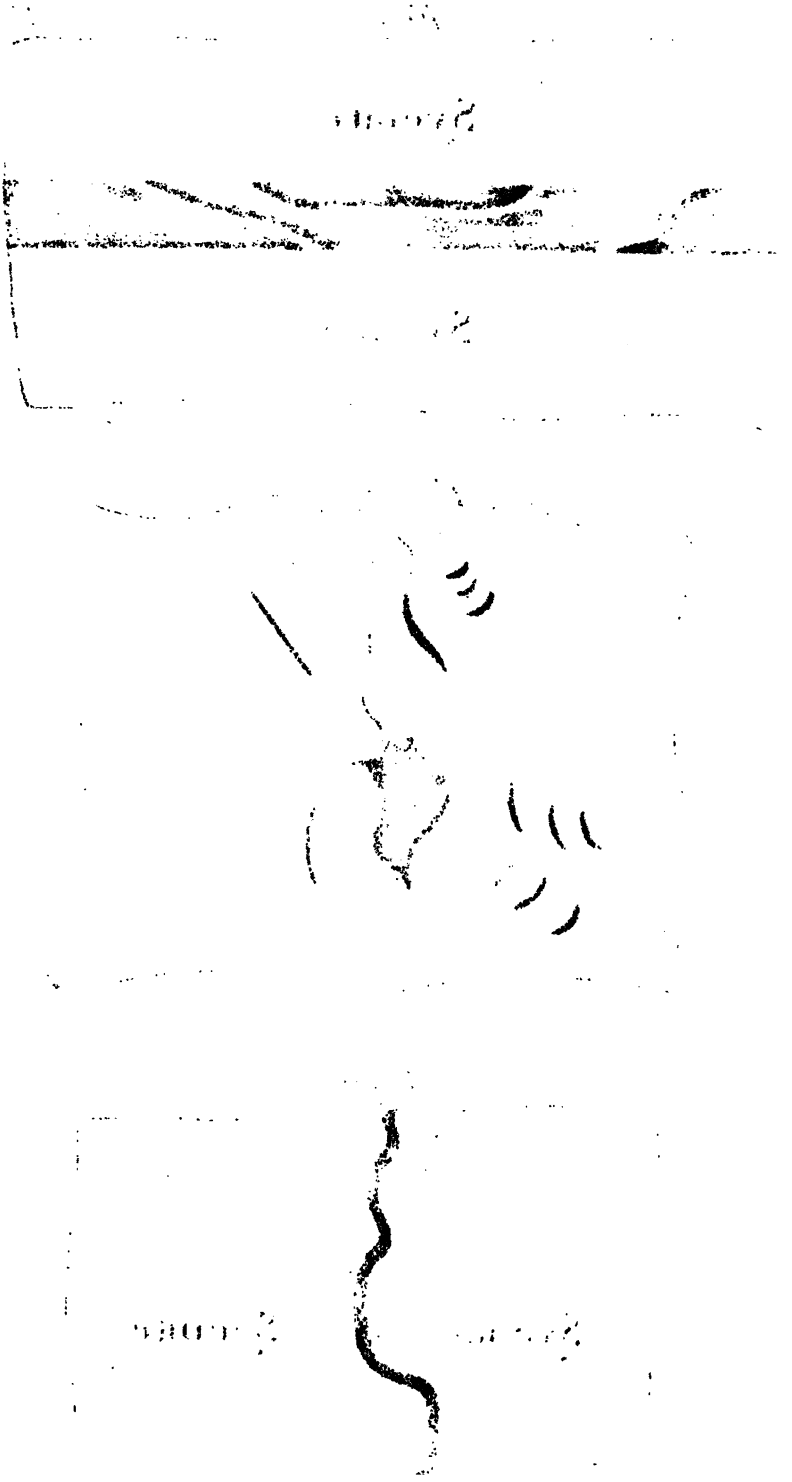
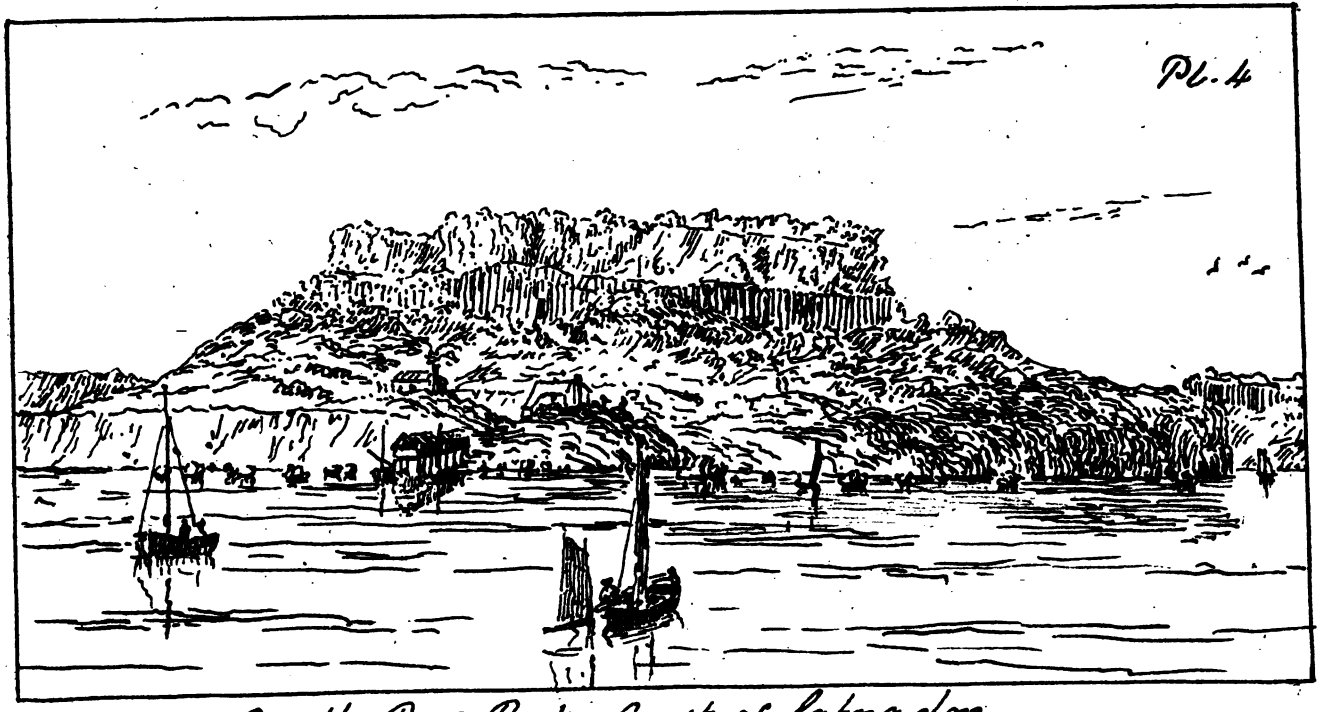






Castle Reef Rock, Coast of Labrador

VIII.

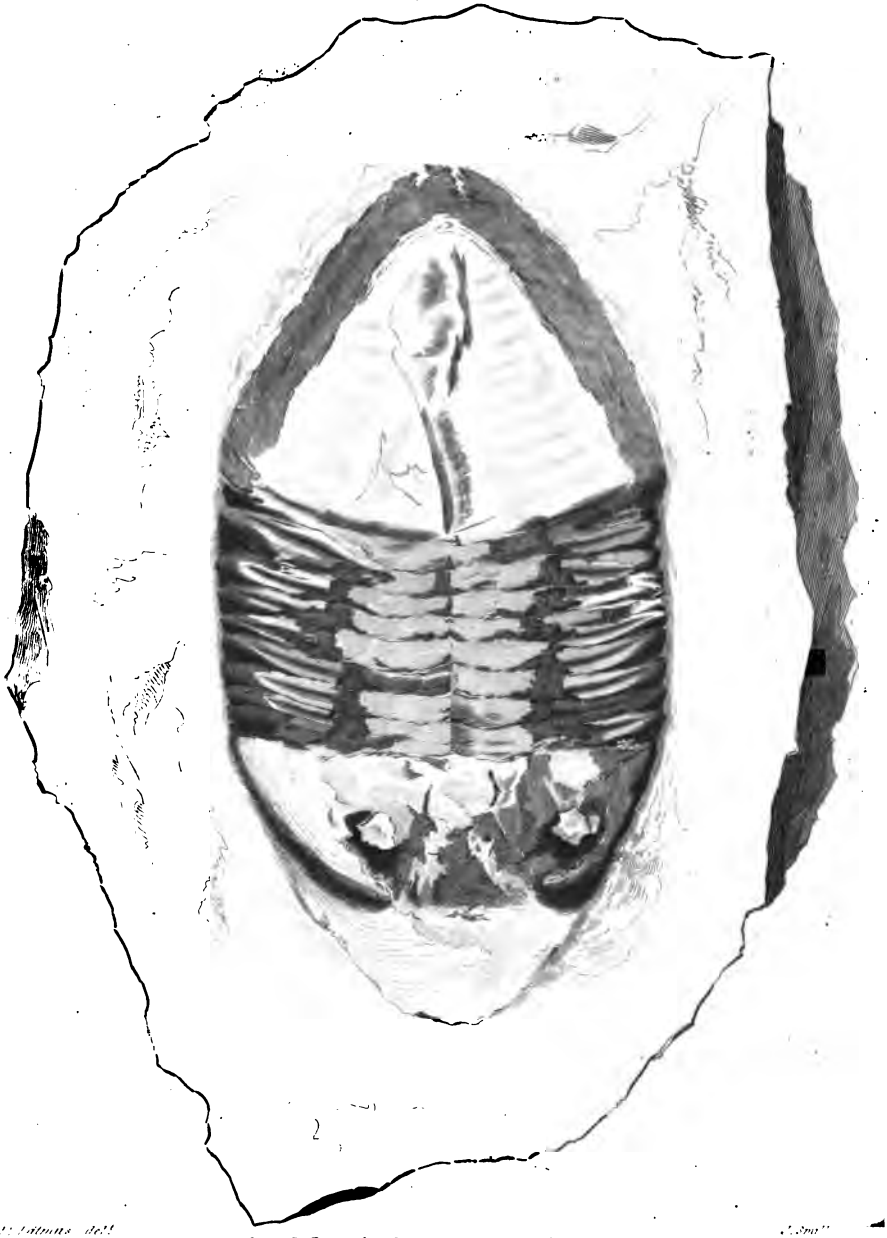
L. P. Lutmus del.

J. Smallie sc.

AN UNKNOWN FOSSIL ORGANIC REMAIN

from Lake St. John, Lower Canada.

Drawn the natural size.



from Lake St. John. Lower Canada.—
Drawn the natural size from the specimen in the writers possession.

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